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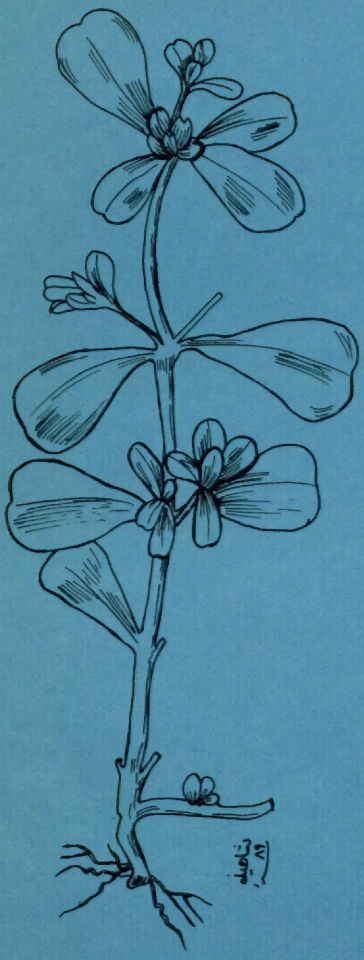

FLORA OF NIGERIA: CARYOPHYLLALES

By Shahina A. Ghazanfar

Missouri Botanical Garden

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FLORA OF NIGERIA: CARYOPHYLLALES[1]

Shahina A. Ghazanfar[2]

Abstract

The Caryophyllales are represented by 73 species in Nigeria. In the present account description, distribution, flowering period, and notes on habitat are given for each species. Information on medicinal and other uses and vernacular names are also given for most of the species. Several new records are described for Nigeria.

Ten families of the order Caryophyllales (also known as the order Centrospermae) occur in Nigeria. These are represented by 31 genera and 73 species.

Members of the Caryophyllales are allied by several features, such as the presence of a distinctive type of sieve-tube plastid. The ornamentation of pollen grains and a series of embryological features further unite members of the order. Most Caryophyllales produce betalains and lack anthocyanins. However, betalains do not occur in two of the families (Caryophyllaceae and Molluginaceae). These families, which produce anthocyanins, have been retained in the Caryophyllales on macro- and micromorphological characters (Cronquist, 1981, and references therein).

Species of Nigerian Caryophyllales are distributed more or less throughout the country. Most of the Amaranthaceae occur in the drier regions of northern Nigeria, whereas Basellaceae, Cactaceae, and Phytolaccaceae are restricted to the moister forested areas of southern Nigeria. *Sesuvium portulacastrum* and *Philoxerus vermicularis* are maritime and occur only in the coastal areas of Lagos. A few species, such as *Uebelinia nigerica*, *U. hispida*, *Drymaria villosa* (Caryophyllaceae) and *Cyathula uncinulata* (Amaranthaceae), occur at high altitudes (±1,700 m), and have been collected only from Obudu (Cross River State) and the Mambilla Plateau (Gongola State). *Rhipsalis baccifera* (Cactaceae) is epiphytic, and, as the other cacti, introduced in tropical Africa.

Materials and Methods

The majority of the species have been described from herbarium material. Fresh specimens have been used for some of the species. Cronquist's (1981) system of classification has been used for the delimitation of the families. Keys to the genera and species are given for each family. Specimens are cited by states (in alphabetical order), with at least one specimen for each state (Map 1). Material selected for citations was collected after the publication of Hutchinson & Dalziel's (1954) *Flora of West Tropical Africa*, Volume 1, Part 1, unless no post-1954 collections had been made. Illustrations were prepared from either fresh or herbarium material. Vernacular names are given when known (Gbile, 1980). Most of the specimens studied and cited were present in the herbarium at the Forestry Research Institute of Nigeria in Ibadan (FHI). Collectors' numbers of the specimens at FHI are not cited as they were found to be incorrect on most specimen sheets. Therefore, the specimens are cited by the FHI accession number. Other sources

[1] I thank the curators of the following herbaria for access to their specimens: Ahmadu Bello University, Zaria; N.A.P.R.I., Shika; Royal Botanic Gardens, Kew; University of Jos, Jos; Obafemi Owolowo University, Ile-Ife; Forestry Research Institute of Nigeria, Ibadan; and Ibadan University, Ibadan. My deepest thanks extend to Professor B. J. Harris, Professor W. W. Sanford, Mr. Zac. O. Gbile, and Dr. J. Lowe for providing information and facilities during the course of this study, and to my husband, Dr. Y. Martin, for accompanying me on collecting trips throughout Nigeria. I am grateful to Dr. P. Goldblatt for his initial interest in this study and to an anonymous referee for criticism and valuable suggestions. Additional gratitude is due to Mrs. Alice Fongod, Mr. M. S. Bello, and Mr. J. Gbian for typing the first draft of this manuscript. Drs. Y. Martin and H. S. N. Hussain critically read the first draft of the manuscript.

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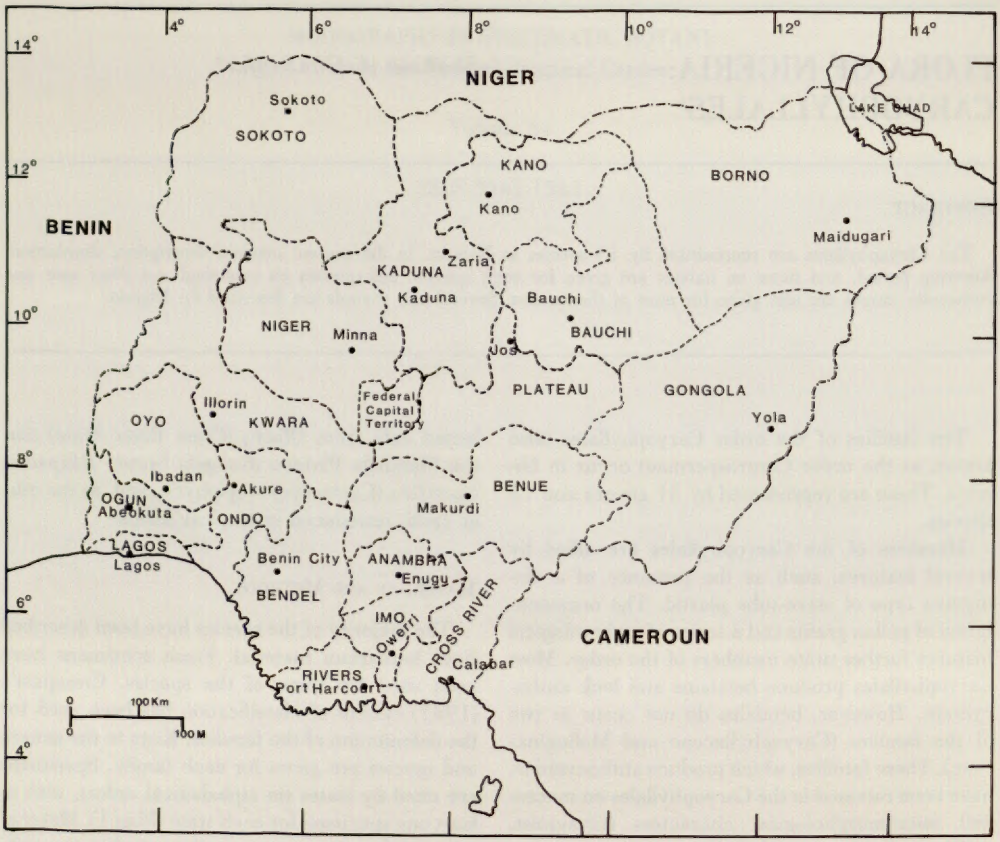

MAP 1. States and main cities of Nigeria.

of material were the herbaria of Ahmadu Bello University, Zaria (ABU), Bayero University, Kano (BUK), University of Jos, Jos (JOS), Ibadan University, Ibadan (UCI), Obafemi Awolowo University, Ile-Ife (IFE), duplicates of specimens present at Lagos University, Lagos (LUH), specimens and some type specimens at Kew Herbarium (K), and a few type specimens at the herbarium, Linnean Society, Burlington House, London, U.K. (LINN).

LITERATURE CITED

CRONQUIST, A. 1981. An Integrated System of Classification of Flowering Plants. Columbia Univ. Press, New York.

GBILE, Z. O. 1980. Vernacular Names of Nigerian Plants (Hausa). Federal Department of Forestry, Lagos, Nigeria.

HUTCHINSON, J. & J. M. DALZIEL. 1954. Flora of West Tropical Africa (revised by R. W. J. Keay), 2nd edition, Volume 1. Pp. 129–137, 142–156, 176–178. Crown Agents for Overseas Governments and Administrations, London, U.K.

For a detailed bibliography see White (1983), *The Vegetation of Africa. A Descriptive Memoir to Accompany the UNESCO/AETFAT/UNSO Vegetation Map of Africa.* USCO, Paris.

PHYTOLACCACEAE

A family of 18 genera and 125 species, widespread in tropical and subtropical regions, especially of the New World. Represented in Nigeria by four species.

Gisekia has been treated under Molluginaceae by many authorities. In the present account, following Cronquist's (1981) classification, it is placed in Phytolaccaceae. *Gisekia* resembles the Molluginaceae in habit, inflorescence, and some pollen characters, but differs by having free carpels. *Gisekia* contains betalains, which have not been found in the Molluginaceae.

KEY TO THE GENERA OF PHYTOLACCACEAE IN NIGERIA

1a. Carpels 5.
2a. Carpels free, muricate ..... 2. *GISEKIA*

2b. Carpels connate basally, smooth ..... 1. *PHYTOLACCA*

1b. Carpel 1.

3a. Sepals 5, ovary glabrous ..... 3. *HILLERIA*

3b. Sepals 4, ovary white-hairy ..... 4. *PETIVERIA*

1. PHYTOLACCA L.

A small genus of 35 species, distributed in the tropical, subtropical, and temperate regions, mostly in America. Represented in Nigeria by a single species.

1. **Phytolacca dodecandra** L'Her., Stirp. Nov. 143, t. 69. 1791. TYPE: Ethiopia: plant cultivated from seed in Paris, *Bruce s.n.* (holotype, P not seen).

[*Phytolacca abyssinica* Hoffm., Comm. Gotting. 12: 25, t. 2. 1796, nom. illegit.]

Dioecious liana or a scandent shrub. Older branches with prominent leaf scars. Leaves petiolate, 38–150 × 20–100 mm, elliptic to ovate-elliptic, glabrous, apex acute to acuminate, base cuneate or rounded, sometimes unequal, with dark veins. Petiole 10–50 mm long. Flowers male and bisexual. Inflorescence of long racemes, up to 40 cm long, often pendulous. Pedicel 2–12 mm long. Male flowers: sepals 2–3 mm long, ovate-oblong, somewhat fleshy; stamens 8–15; filaments white, 4–5 mm long; carpels obscure. Bisexual flowers: stamens 8–15, filaments ca. 1.5 mm long; carpels 5, basally united. Berry depressed globose, 3–4 × 3.5–4 mm, 3–5-lobed, fleshy, bright red when ripe. Seed ca. 3 mm across, black.

Specimens examined. NIGERIA. BENDEL: near Benin, on Ore–Benin rd., *J. B. Faremi 1533* (IFE). CROSS RIVER: Calabar, Ikpai, *M. G. Latilo* (FHI 53989). ONDO: Akure forest reserve, lowland rain forest zone, *Z. Gbile, J. Olorunfemi & A. Binuyo* (FHI 86883); Ondo–Akure rd., *J. Medler 243* (IFE). OYO: Ife University, *J. B. Faremi 1976* (IFE).

Found in southern Nigeria, in forested areas. The inflorescences are fragrant. The plant is highly poisonous. Flowering February–April.

2. GISEKIA L.

A small genus of two species, distributed in tropical and southern Africa, India, Sri Lanka, and Indochina. Represented in Nigeria by a single species.

1. **Gisekia pharnaceoides** L., Mant. 2: 562. 1771. TYPE: E. India, cultivated at Uppsala (holotype, LINN not seen). Figure 3G.

Gisekia linearifolia Schum. & Thonn., Beskr. Guin. Pl. 167. 1827. TYPE: Ghana: *Thonning s.n.* (holotype, C not seen).

G. rubella Moq. in DC., Prodr. 13(2): 27. 1849. TYPE: Sudan: *Kotschy 2* (isotype, K).

Small herb, 7–9 cm tall, with sparse, diffuse branching. Stems decumbent to prostrate, glabrous, somewhat succulent. Leaves opposite or subopposite, 15–20 × 8–10 mm, variable in shape, generally linear to oblanceolate, 1–3-nerved, sessile, apex obtuse. Numerous conspicuous raphides present on the lower leaf surface. Flowers bisexual, greenish, sometimes tinged pink, up to 30, in lax or congested cymes. Pedicel 7–10 mm long. Sepals 5, 2–2.5 mm long, elliptic-rounded, glabrous, with a hyaline margin, 3-nerved. Stamens half as long as the sepals, expanded at the base. Carpels 5, muricate, sometimes 1 or 2 reduced and undeveloped. Styles 5.

Specimens examined. NIGERIA. BAUCHI: Yankari Game Reserve, *Ekwuno, Fagbemi Odewo & Ihe* (FHI 87646). LAGOS: Lagos Badagary Police Station, *M. Hossani & J. Opayemi 1319* (FHI, LUH 457). OGUN: see below. SOKOTO: Birnin Kebbi, flowers red, fruit green, *M. G. Latilo* (FHI 62618); Zinder rd., *J. B. Hall 407* (IFE).

Species variable in the size and shape of leaves. The specimen FHI No. 64971, Ogun State, district Abeokuta, near Ogun river, 6 miles south of Abeokuta, near Oba village, 2 Feb. 1972, *P. Wit & Fagbemi 1227*, is identified as *G. pharnaceoides* but differs from the other specimens examined in having smaller leaves (6–8 mm long), filiform pedicels (2.5–3 mm long), and profuse slender leafy branches. It falls under *G. rubella*, which is treated here as a synonym of *G. pharnaceoides*.

The stems and branches are often tinged red due to a blight, *Exobasidium gisekiae* Allesch., according to Hutchinson & Dalziel (1954). Flowering June–August. Hausa: *Dandami, Lallenshaamunaa*.

3. HILLERIA Vell.

Mohlana Mart., Nov. Gen. & Sp. 3: 170, t. 290. 1832.

A small genus with five species distributed in Central America and tropical South America. *Hilleria latifolia* is extensively naturalized in Africa, Madagascar, and the Mascarene Islands.

1. **Hilleria latifolia** (Lam.) H. Walter in Engl., Pflanzenr. IV. 83: 81, t. 25 (Heft 39). 1909. *Rivinia latifolia* Lam., Encycl. 6: 215. 1804. TYPE: Mauritius: *J. Martin* (holotype, P not seen). Figure 1F1–F3.

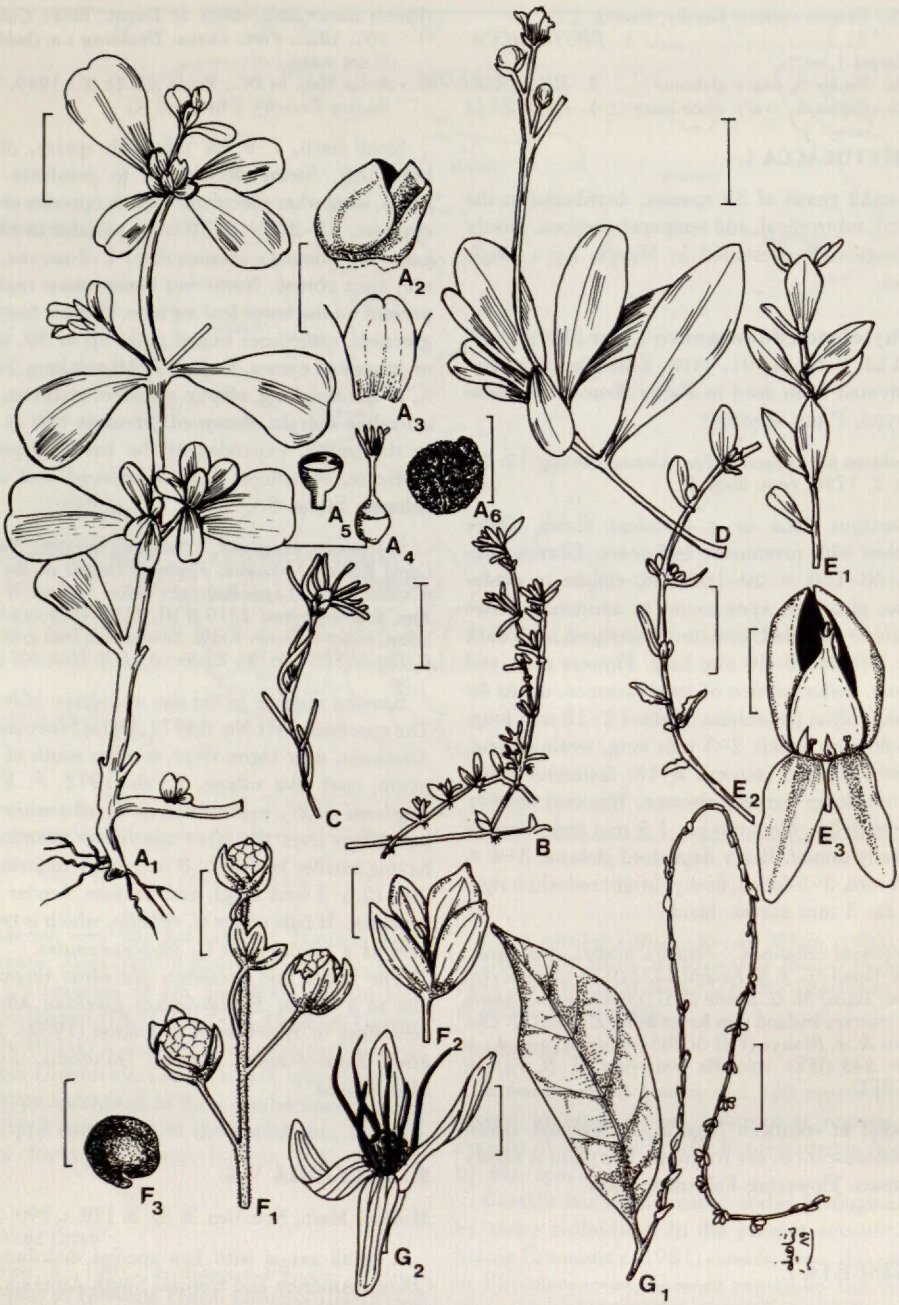

FIGURE 1. A1–A6. *Portulaca oleracea*.—A1. Habit.—A2. Sepals.—A3. Petal.—A4. Gynoecium.—A5. Dehisced capsule.—A6. Seed.—B. *P. quadrifida*, habit.—C. *P. foliosa*, habit.—D. *Talinum triangulare*, habit.—E. *Corrigiola russelliana*.—E1. Vegetative shoot.—E2. Shoot with flowers.—E3. Flower. F. *Hilleria latifolia*.—F1. Habit (with fruits).—F2. Flower.—F3. Seed. G. *Petiveria alliacea*.—G1. Leaf with inflorescence, habit.—G2. Flower. Scale bars A1, B, C, D, E1–2, F1, G1 = 20 mm; A2–5 = 5 mm; F2–3, G2 = 2 mm; A6, E3 = 1 mm.

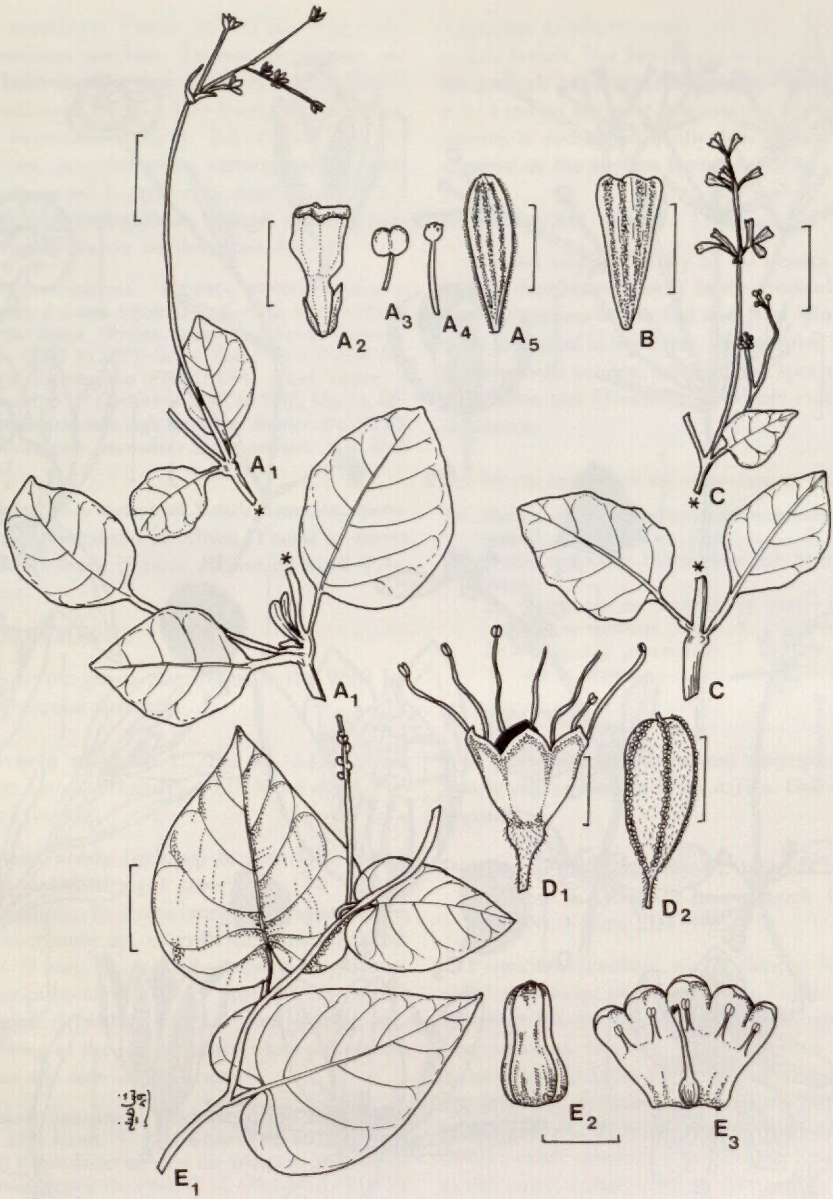

FIGURE 2. A. *Boerhavia diffusa*.—A1. Habit.—A2. Flower.—A3. Anther, enlarged.—A4. Style and stigma, enlarged.—A5. Fruit.—B. *B. erecta*, fruit.—C. *Commicarpus plumbagineus*, habit. D. *Pisonia aculeata*.—D1. Male flower.—D2. Fruit. E. *Basella alba*.—E1. Habit.—E2. Flower.—E3. Flower, opened. Scale bars A1, C, = 20 mm; D2 = 5 mm; A2, A5, B, D1 = 2 mm.

Rivinia apetala Schum. & Thonn., Beskr. Guin. Pl. 84. 1827. TYPE: Ghana: *Thonning* (isotype, C not seen). *Mohlana nemoralis* C. Martius, Nov. Gen. & Sp. 3: 171, t. 290. 1832. TYPE: Brazil. Bahia: *Martius* (holotype, M not seen).

Perennial herb, often woody, up to 2 m tall. Stems and branches becoming glabrous, pubescent when young. Leaves alternate, glabrous, 60–130 × 32–50 mm, ovate-lanceolate to elliptic, apex

FIGURE 3. *Mollugo cerviana.*—A1. Habit.—A2. Flower.—A3. Seed. B. *Limeum pterocarpum.*—B1. Habit.—B2. Flower.—B3. Fruit. C. *Glinus oppositifolius.*—C1. Habit.—C2. Flower.—C3. Seed. D. *G. lotoides.*—D1. Habit.—D2. Flower with front sepal removed.—D3. Seed. E. *Sesuvium portulacastrum.*—E1. Habit.—E2. Flower.—E3. Flower with front sepals removed.—E4. Seed.—F. *Zaleya pentandra*, flower.—G. *Gisekia pharnaceoides*, flower. Scale bars B1, C1, D1, E1 = 20 mm; A1, B3, = 10 mm; E2–3 = 5 mm; A2, C2, D2, F, G = 2 mm; B2, E4 = 1 mm; A3, C3, D3 = 0.5 mm.

acute to acuminate. Petiole 20–80 mm long, slender, sometimes setulose. Flowers in slender racemes. Inflorescence axis sparsely hairy. Bracts ovate, caducous. Pedicel 3.5–4 mm long, slender. Flowers bisexual; sepals 4, 2.5–3 mm long, of unequal size, greenish white, turning pink in fruit; stamens 4; carpel 1; style very short. Fruit 2–2.5 × 2 mm, depressed-globose, orange, ripening purple-black, reticulately nerved when dry.

Specimens examined. NIGERIA. BENDEL: Uzairuwe, NE of Auchi, *J. Lowe 1970* (IFE, K, FHI, UIH 71892). CROSS RIVER: Ogoja, Obubra, Iyamoyong Forest Reserve, *A. Binuyo* (FHI 41365). OGUN: Ilaro, Ilaro Forest Reserve, *J. A. Emwiogbun* (FHI 18244). ONDO: Akure, *J. Olorunfemi & S. T. Oguntayo* (FHI 86756); Idanre, Mt. Orosun, semideciduous high forest, *J. Medler 360* (IFE). OYO: Ife University, secondary forest margin, *J. B. Hall 239* (IFE).

Regarded as a native of South America, introduced and naturalized in Africa. Found in forest regions in southern Nigeria. Flowering April–July, November.

4. PETIVERIA L.

A monotypic genus, distributed in the West Indies and tropical America.

1. **Petiveria alliacea** L., Sp. Pl. 342. 1753. TYPE: Jamaica (holotype, LINN not seen). Figure 1G1–G2.

Perennial woody herb, up to 1 m tall. Leaves alternate, petiolate, light green, 60–150 × 30–60 mm, elliptic to ovate-lanceolate, apex acute, with a mucronate tip, margin sometimes crisped. Petiole 7–9 mm. Flowers subsessile, in long drooping, white-pubescent, axillary racemes 20–30 cm long. Sepals 4, white, 4.0–4.5 mm, oblong; stamens as long as the sepals; ovary white-pubescent; stigma on one side of the ovary.

Specimens examined. NIGERIA. OGUN: Ilaro Forest Reserve, high forest, *T. K. Odewo* (FHI 88122). OYO: Olokemeji Forest Reserve, after the bridge on river Ogun, smell often affecting the eyes, *O. A. Olatunji 519* (IFE); same locality, strong aromatic herb, *I. B. Faremi 1363* (IFE); Ikere, Agbeji village, *T. K. Odewo & A. Binuyo* (FHI 99111); Iseyin, foot of Ado Rock, flowers pale green, *P. Wit & Z. O. Gbile* (FHI 64490).

Occurs in southern Nigeria in forest areas. The plant is strongly aromatic, and the smell is recorded to cause irritation to the eyes. Flowering September–November.

NOTE:

Rivinia humilis L. has been recorded from Ibadan. It is a tall herb, with glabrous or pubescent, lanceolate to elliptic-ovate, petiolate leaves (5–12 × 2.5–6 cm). The flowers are in lax racemes, with the pedicels becoming recurved in fruit. The berry is 3–4 mm in diameter, turning red when ripe. The species is sometimes cultivated. I have seen no material of the species from Nigeria.

NYCTAGINACEAE

A small tropical family of 30 genera and 300 species distributed chiefly in the tropical and subtropical regions of the Old and New World, being more abundant in the latter. Represented in Nigeria by three wild genera. Additionally, species of *Bougainvillea* and *Mirabilis* are widely cultivated for ornament.

KEY TO THE GENERA OF NYCTAGINACEAE IN NIGERIA

1a. Shrubs, spiny; flowers unisexual; anthocarp long-stalked ..... 1. *PISONIA*
1b. Herbs, not spiny; flowers bisexual; anthocarp sessile.
  2a. Anthocarp obscurely ribbed; flowers in umbels or verticels ..... 2. *COMMICARPUS*
  2b. Anthocarp prominently 3–5-ribbed; flowers in cymes ..... 3. *BOERHAVIA*

1. PISONIA L.

A genus with 50 tropical and subtropical species. Poorly represented in West Africa. One species in Nigeria.

Pisonia aculeata L., Sp. Pl. 1026. 1753. TYPE: habitat in *America meridionali* (holotype, LINN). Figure 2D1–D2.

Perennial, dioecious, woody climber. Stems provided with sharp, recurved spines. Leaves opposite, 50–95 × 30–50 mm, broadly elliptic, apex obtuse, base tapering into the petiole. Leaves finely tomentose on the lower surface when young, becoming glabrous. Inflorescences dense, white-tomentellous cymes. Flowers cream, unisexual. Male flower: calyx tubular, 3.5–4.0 mm long, 5-lobed at the apex; corolla absent; stamens 5; filaments free, about twice the length of the calyx tube. Female flower: sepals similar to those of the male flower; ovary ovoid; style single; anthocarp 8.5–9.5 × 3.5–4.0 mm, cylindrical, rounded above, tapering at the base, sparsely tomentellous. Glands rounded, sessile, or very shortly stalked, present in 5 double longitudinal rows on the ribs.

Additional specimens examined. NIGERIA. ONDO: Oye-Ekite, Ilefa rd., high forest, *J. Olorunfemi, A. Binuyo & Babagbemi* (FHI 96789). OYO: Ibadan, between Oni and Ilugun, roadside forest, semierect shrub to 10 ft., flowers cream-yellow all over, *C. F. A. Onochie* (FHI

40275); Ibadan, Gambari reserve, *C. F. A. Onochie* (FHI 34939); Gambari res., Compd. 9, *F. F. A. Onochie* (FHI 34912).

Widespread in the tropics. Occurs in the forest areas in southern Nigeria.

Other West African material of the species examined at FHI differs from the Nigerian material in having stalked glands and a more tomentellous anthocarp. I have seen the holotype, which also has stalked glands and a tomentellous anthocarp. However, more West African and other material needs to be examined before the specimens with sessile to subsessile glands and sparse indumentum on the anthocarp can be recognized as a separate taxon.

The sticky fruit is eaten by birds, and it sticks to their feet and feathers, which helps in its dispersal. Flowering September.

2. COMMICARPUS Standley

A genus of 16 species distributed in the tropical and subtropical regions. Represented in Nigeria by a single species.

Commicarpus plumbagineus (Cav.) Standley, Contrib. U.S. Nat. Herb. 18: 101. 1916. *Boerhavia plumbaginea* Cav., Icon. Pl. 2: 7, t. 112. 1793 (as *Boerhaavia*). TYPE: Spain (collector & location of type not known). Figure 2C.

Woody perennial. Stems scandent or prostrate, glabrous. Leaves opposite, 20–50 × 18–36 mm, glabrous, broadly ovate, margin irregular and undulate, apex obtuse, base rounded. Petiole up to 20 mm long. Inflorescence axis leafless, the flowers 4 or 5 in umbels or verticils. Bracts linear, membranous. Pedicels 3–5 mm long. Flowers white. Calyx campanulate, 10–15 mm long, 5-lobed; stamens 5; filaments basally connate; ovary ovoid; style slender. Anthocarp 8–10 mm long, clavate, obscurely 10-ribbed, glabrous.

Specimens examined. NIGERIA. BORNO: Kukawa, Wumiri Forest Reserve, *Ekwuno & Fagbemi* (FHI 94078); Zaga Forest Reserve, *Ekwuno & Fagbemi* (FHI 93888).

Found throughout tropical Africa. Also in southern and northern Africa. Occurs in dry, arid localities in northern Nigeria. Flowering September–October.

3. BOERHAVIA L.

A genus of 40 species distributed in the tropical and subtropical regions. Represented in Nigeria by four species.

KEY TO THE SPECIES OF *BOERHAVIA* IN NIGERIA

1a. Anthocarp eglandular; inflorescence erect ..... 1. *B. erecta*

1b. Anthocarp glandular; inflorescence diffuse.

2a. Stems and branches prostrate or procumbent, leafy throughout; sepals ca. 1 mm long ..... 2. *B. repens*

2b. Stems and branches erect or ascending, usually leafless in the upper portion; sepals more than 1 mm long.

3a. Stems glabrous; flowers crimson or magenta; leaves often with ciliate margins ..... 3. *B. diffusa*

3b. Stems densely pubescent; flowers pink; leaves without ciliate margins ..... 4. *B. coccinea*

1. **Boerhavia erecta** L., Sp. Pl. 3. 1753. TYPE: habitat in Vera Cruz, Linnean specimen (holotype, LINN not seen). Figure 2B.

Perennial herb. Stems 50–70 cm tall, branched, erect, glabrous, pubescent only at the nodes. Leaves opposite, glabrous, petiolate, 25–50 × 20–30 mm, ovate, apex rounded, sometimes apiculate, nerves somewhat depressed. Inflorescence erect, lax, leafless. Bracts and bracteoles lanceolate to linear-lanceolate. Calyx 3–3.5 mm long, white or tinged pink, obscurely lobed at the apex; stamens (1)2. Anthocarp 3.5–4.5 mm long, obovoid, 5-ribbed, smooth, eglandular.

Specimens examined. NIGERIA. OYO: Shaki, Babo rd., *Z. Gbile & J. Olorunfemi* (FHI 20480); Ago-Are-Irawo-Owode rd., *J. Olorunfemi, A. Binuyo & Babagbemi* (FHI 96400).

A pantropical weed. Common in open waste places and by roadsides. Flowering October.

Boerhavia erecta is similar to *B. diffusa* but differs by having eglandular fruit, a more branched inflorescence, and white or pale pink sepals. The lower part of the stems, petioles, and leaf margins are often tinged crimson.

2. **Boerhavia repens** L., Sp. Pl. 3. 1753. TYPE: habitat in Nubia *inter Mocho & Tangos*, Linnean specimen (holotype, LINN not seen).

Perennial herb. Stem and branches prostrate or procumbent, pubescent, leafy throughout. Leaves opposite, 10–15 × 5–7 mm, ovate-lanceolate. Pedicel glabrous. Flowers small, white or pink, in axillary cymes; sepals ca. 1.0 mm long. Anthocarp 2.5–3.3 mm long, 5-ribbed, glandular at the ribs.

Specimens examined. NIGERIA. BORNO: near Arege, *P. N. de Leuw* (FHI 27284); Biu, *P. Wit, Z. Gbile & B. O. Daramola* (FHI 65057). KANO: Kazaure irrigation canals, open disturbed and wet places, in open savanna grassland, *I. B. Faremi s.n.* (IFE); Kano, along city rd.,

B. O. Daramola (FHI 61357). SOKOTO: Talata Mafara, bank of stream, *M. G. Latilo* (FHI 62819).

Widespread in the drier regions of the tropics. Found in the more arid regions of Nigeria in damp places by the banks of streams and canals. Flowering August–October.

Distinguished from *Boerhavia erecta* and *B. diffusa* by its prostrate to procumbent leafy branches, smaller flowers, and glandular fruits.

3. **Boerhavia diffusa** L., Sp. Pl. 3. 1753. *B. repens* var. *diffusa* (L.) Hook. f., Fl. Trop. Africa 6(1): 5. 1927. TYPE: habitat in India, Linnean specimen (holotype, LINN not seen). Figure 2A1–A5.

Perennial herb. Stems 30–70 cm long, branches diffuse, prostrate or ascending, glabrous. Leaves opposite, 25–40 × 20–35 mm, broadly ovate, glabrous, often with ciliate margins, apex rounded, base sometimes oblique. Petiole 10–40 mm long, glabrous or sparsely pubescent. Inflorescence leafless. Bracts 10–15 mm long, linear-lanceolate. Bracteoles 1.5–3.5 mm long, lanceolate. Flowers sessile in umbellate heads. Flowers crimson or magenta; calyx 3–3.5 mm long, obscurely 10-lobed; stamens (1)2; filaments and style red; anthocarp 4–4.5 mm long, 5-ribbed, glandular-pubescent on the ribs.

Specimens examined. NIGERIA. BORNO: Biu division Waka, T. T. C. compound, *R. W. Fishwick* (FHI 42096). CROSS RIVER: 32 km NW of Obigbo, near Port Harcourt, *A. O. Isichei & W. W. Sanford A/010* (IFE). KADUNA: Katsina, sandy waste ground, *J. B. Hall 362* (IFE); Zaria, 1 mi. NE of Kaduna, *J. A. D. Jackson 323* (FHI 57135). KANO: Kano, Bayero Univ. campus, *S. A. Ghazanfar s.n.* (BUK). KWARA: Kainji, *Onyeachusim & A. Binuyo* (FHI 58211). ONDO: Akure, Owena, *B. A. Ola-Adams* (FHI 61452). OYO: Ibadan, Garden quarter, Jericho, *P. Wit* (FHI 27255). PLATEAU: Panyam, *J. B. Hall 1972* (IFE).

A common weed, widespread in the tropics. Found throughout Nigeria, in cultivated fields, gardens, open places, and by roadsides. The glandular fruits stick to the fur and legs of animals and to clothing, which aid in their dispersal. Flowering November–July. Hausa: *Babba jibji.*

4. **Boerhavia coccinea** var. **coccinea** C. Miller, Gard. Dict. No. 4. 1768. TYPE: Jamaica. Collector & location not known.

Boerhavia coccinea C. Miller var. *α* Keay in Hutch. & Dalziel, Fl. West Trop. Afr. 2nd edition 1(1): 178. 1954.

Perennial herb with erect or prostrate or straggling stems, up to 1 m long. Stems densely pubescent. Leaves opposite, petiolate; petiole 10–20 mm long, usually one long and other short of the opposite leaves on the same node. Leaves 20–45 × 22–23 mm, broadly ovate, margins undulate, apex obtuse, often with a mucronate tip, sparsely pubescent. Inflorescence axis slender, with the flowers in axillary and terminal cymes. Pedicels and peduncles pubescent-glandular. Flowers pink. Anthocarp 3–3.1 mm long, 5-ribbed, glandular at the ribs.

Specimens examined. NIGERIA. BAUCHI: NE Gombe, *Z. Gbile, P. Wit & B. O. Daramola* (FHI 65446). BENDEL: Irrua, Atuagbo Forest Reserve, *Ekwuno et al.* (FHI 95337). KADUNA: Zaria, near Kuyana village, *J. A. D. Jackson 337* (IFE; FHI 57149). KWARA: Shagun Research Station, *J. B. Hall 1497* (IFE). OYO: Iwo–Ede rd., *I. B. Faremi 719* (IFE); Ibadan, around Abidogun village, in forest, *S. T. Oguntayo* (FHI 32200).

A common weed in shaded and damp locations, throughout Nigeria. Flowering May–October.

B. coccinea var. **viscosa** (Lag. & Rodriguez) R. M. Rosc., Cat. Fl. Doming. 1: 180. 1943. *Boerhavia viscosa* Lag. & Rodriguez, An. Cienc. Nat. 4: 256. 1801. TYPE: not located.

Stems and leaves densely pubescent, viscid.

Specimens examined. NIGERIA. BENDEL: Benin, Ishan, flowers pink, *J. I. Okogun* (FHI 99497). BORNO: Munguno, Zaga Forest Reserve, flowers pink, *Ekwuno & Fagbemi* (FHI 93906).

Boerhavia coccinea var. *viscosa* is similar to *B. coccinea* var. *coccinea* in vegetative and floral characters but differs in its viscid, densely pubescent stems and leaves. Not as common as *B. coccinea* var. *coccinea*. Flowering March, September.

CULTIVATED SPECIES OF NYCTAGINACEAE IN NIGERIA

Mirabilis jalapa L., Sp. Pl. 177. 1753.

Perennial, erect herb or a small shrub. Leaves up to 10 × 60 cm, petiolate, broadly ovate, apex acute to acuminate, base straight or rounded. Bracts pubescent. Inflorescence of few-flowered terminal or axillary cymes. Calyx red, purple, magenta or yellow, with a long tubular lower portion, 5-lobed above. Fruit black when ripe.

A native of Peru, now widely cultivated as a garden ornamental. The flowers remain closed in the morning and open in the afternoon. Flowering September.

Bougainvillea glabra Choisy in DC., Prodr. 13(2): 437. 1849.

Straggling perennial shrub, up to 6 m tall. Spines straight or sometimes absent. Leaves broadly ovate. Flowers in axillary or terminal panicles. Bracts enlarged, purple, surrounding the calyx. Calyx white, tubular, 5-lobed at the apex.

Native of Brazil, cultivated throughout Nigeria ornamentally. The bracts persist on the plant for a long time. Flowering April–July, September.

Bougainvillea spectabilis Willd., Sp. Pl. 2: 348. 1798.

Straggling or climbing, perennial shrub, reaching up to 10 m tall. Stems with sharp, curved spines. Leaves ovate to elliptic. Bracts reddish magenta.

Native of Brazil, cultivated throughout Nigeria in gardens and public parks. Varieties with pink, scarlet, or white bracts are also cultivated. Flowering May–July, September.

AIZOACEAE

A family of 115 tropical and subtropical genera and 2,410 species. Most of the species are found in South Africa. Many species cultivated for ornament. Represented in Nigeria by five genera and six species.

KEY TO THE GENERA OF AIZOACEAE IN NIGERIA

1a. Fruit separating into 2, 1-seeded cocci ..... 4. *LIMEUM*

1b. Fruit dehiscence operculate.

2a. Capsule 3–5-locular; styles 3–5. Maritime ..... 1. *SESUVIUM*

2b. Capsule 1–2-locular; styles 1–2. Terrestrial.

3a. Styles 2; capsule (pyxidium) 4-seeded, dehiscence operculate, the valves splitting longitudinally ..... 2. *ZALEYA*

3b. Style usually 1; capsule (pyxidium) 2–many-seeded, dehiscence circumscissile ..... 3. *TRIANTHEMA*

1. SESUVIUM L.

A small genus of six species distributed on the tropical and subtropical coasts. Represented in Nigeria by one species.

1. **Sesuvium portulacastrum** (L.) L., Syst. Nat., 10th edition 2: 1058. 1759. *Portulaca portulacastrum* L., Sp. Pl. 1: 446. 1753. TYPE: Curacao, *Hermann* (holotype, BM-SL not seen). Figure 3E1–E4.

Succulent herb. Stems glabrous, prostrate, spreading, often rooting at the nodes. Leaves opposite, sessile, 25–45 × 3–5 mm, narrowly oblanceolate, apex obtuse, base expanding at the end. Axillary leaf fascicles present. Flowers axillary, solitary. Bracteoles 2. Pedicel up to 12 mm long. Calyx 8–9 mm long, deeply lobed; lobes 5, acute, each with a small mucro on the dorsal surface, the margin broad-membranous; petals absent; stamens many, inserted at the top of the calyx tube; ovary 2–5-locular, superior; styles 3. Seed ca. 1 mm in diameter, globose, beaked, black, smooth.

Specimens examined. NIGERIA. BENDEL: Primrose Creek, reddish orange stems, *D. P. M. Marsh* (FHI 054743). LAGOS: Takua Bay, *coll. ignot.* (ABU, LUH). RIVERS: Dagema, mangrove, stem & leaves reddish pink, *J. C. Okafor & E. J. Osam s.n.* (UCI).

Found on the coasts in sand in the Lagos area. Flowering February–March.

2. ZALEYA Burm. f.

A genus of about six species distributed in tropical Africa, Asia, and Australia. Represented in Nigeria by a single species.

1. **Zaleya pentandra** (L.) Jeffrey, Kew Bull. 14: 238. 1960. *Trianthema pentandra* L., Mant. 1: 70. 1767. TYPE: Arabia: cultivated at Uppsala from seed sent by *Forskal* (lectotype, LINN not seen). Figure 3F.

Prostrate annual herb. Stems leafy. Branches spreading or sometimes climbing, hirsute. Leaves in clusters at the nodes, 18–25(–42) × 6–7(–16) mm, oblong-lanceolate, apex acute or obtuse, base tapering into a long or short petiole, sheathing. Flowers bisexual, axillary, greenish white, subpedicellate, on the main and lateral branches. Sepals 5, 4.5–5 mm long, basally united, oblong-lanceolate, the midrib ending in a small subapical mucro; petals absent; stamens many; filaments slightly expanded at the base; styles 2. Pyxidium 2–5 mm diam., 4-seeded. Seeds ca. 1.5 mm diam., black, tuberculate.

Specimens examined. NIGERIA. BAUCHI: Gombe, *B. O. Daramola* (FHI 63701). KWARA: Kabba, Egbe town, *M. G. Latilo* (FHI 62255). SOKOTO: Talata Mafara, *M. G. Latilo* (FHI 62815).

Widespread in the drier parts of Africa and Arabia. Flowering August–November. Hausa: *Gadan maciji.*

3. TRIANTHEMA L.

A genus of about nine tropical and subtropical species, distributed in Africa, Asia, and Australia.

One species is found in tropical America. Represented in Nigeria by a single species.

1. **Trianthema portulacastrum** L., Sp. Pl. 223. 1753. TYPE: Curacao: *Hermann* (lectotype, BM-SL not seen).

[*Trianthema monogyna* L., Mant. Pl. 1: 69. 1767, nom. illegit.]

Annual herb, 15–50 cm tall. Branches diffuse, suberect to ascending, fleshy, glabrous or sparsely pubescent, tinged pink. Leaves anisophyllous, 15–32 × 15–30 mm, broadly ovate to orbicular, apex rounded or emarginate, base tapering, sheathing; stipules 2–3 mm long, narrow-triangular, pink-tinged. Large leaves petiolate, the smaller leaves sessile or subpetiolate. Leaf fascicles present in the axils. Flowers sessile, solitary, partly enclosed by the sheathing leaf base. Calyx 2.5–3 mm, 5-lobed, lobes lanceolate; petals 5, 4.5–5.5 mm long, oblong, white, tinged pink, with a dorsal green rib ending in a small subapical red mucro; rib sparsely pubescent; stamens 10–20; filaments unequal in length, white, anthers pink; carpel 1; style 1. Pyxidium ca. 4 mm long, 4–5-seeded. Seeds ca. 2 mm broad, black, rugose.

Specimens examined. NIGERIA. KADUNA: Zaria, Kufena, *T. C. N. Baker 1044* (ABU). KANO: Kano, Bayero Univ., *S. A. Ghazanfar 343* (BUK). ONDO: Obada-Oke, scrambling herb, *Ibhanesebhur* (FHI 90843). OYO: Ibadan, *Jones* (FHI 4895); Ibadan Univ., weed, *D. P. M. Guile 141* (IFE); Ife Univ., *A. A. Sijuade 592a* (IFE).

Widespread in the tropics. Often occurring as a weed in damp, shady, waste places. Flowering May–June. Hausa: *Gadan maciji.*

4. LIMEUM L.

A genus of 28 tropical species centered in South Africa. Also distributed in Arabia, India, and Pakistan. Represented in Nigeria by two species.

KEY TO THE SPECIES OF *LIMEUM* IN NIGERIA

1a. Fruit with wings; stem and leaves glabrous ..... 1. *L. pterocarpum*

1b. Fruit without wings; stem and leaves glandular-pubescent, viscid ..... 2. *L. viscosum*

1. **Limeum pterocarpum** (J. Gay) Heimerl in Engl. & Prantl, Pflanzenfam. 3: 1B, 9. 1889. *Semonvillea pterocarpa* J. Gay in Feruss., Bull. Sci. Nat. 18: 412. 1829. TYPE: Senegal (collector & location not located). Figure 3B1–B3.

Annual herb. Stems and branches slender, erect or diffuse, glabrous. Leaves alternate, 20–50 × 3–7 mm, linear-lanceolate, apex acute, base tapering into a short petiole. Flowers bisexual, small, in cymes. Peduncles 20–25 mm long. Pedicel 2–3 mm long, slender. Sepals 5, 2–2.5 mm long, ovate-lanceolate, glabrous, with scarious margins; petals absent; stamens about half as long as the sepals; style 1; stigmas 2. Fruit orbicular, 10–11 mm diam. (including the wings), broadly winged, separating into 1-seeded cocci; wings with narrow membranous margins and forked nerves.

Specimens examined. NIGERIA. BORNO: Nguru, in open savanna, *Edwin Ujor* (FHI 23905). SOKOTO: Sokoto, by roadside, spreading herb, *M. G. Latilo* (FHI 62612); Sokoto, *O. Ohaeri 1912* (ABU).

Found in dry sandy areas, in northern Nigeria. Easily recognized by its delicate stems and orbicular, winged fruits. Flowering April, July.

2. **Limeum viscosum** (J. Gay) Fenzl, Nov. Stirp. Dec. 10: 87. 1839. *Gaudinia viscosa* J. Gay, Bull. Sci. Nat. 18: 412. 1829. TYPE: Senegal, *Sieber 62* (isotype, K).

Annual herb, glandular-pubescent, viscid. Stems weak, diffuse, procumbent or creeping. Leaves viscid, alternate, 15–34 × 12–15 mm, lanceolate to linear-lanceolate or oblanceolate, apex retuse or sometimes mucronate, base tapering into a short petiole. Peduncles up to 2 cm long. Flowers in lax cymes. Sepals 2.5–3 mm long, ovate, unequal; petals absent; stamens 5; ovary 2-lobed. Mericarps 2–5 mm diam., wingless, faces generally reticulate.

A weed of fields and cultivated places. Found in northern Nigeria. Not common. Flowering January–February.

CACTACEAE

A large family with 30–200 genera and about 2,000 species chiefly distributed in the drier regions of tropical America. Most species are introduced and cultivated in tropical Africa. Several species of *Opuntia* are naturalized and often form troublesome weedy shrubs. The fruit of some species of *Opuntia* is edible. Very few species are found in tropical Africa. Represented in Nigeria by a single species.

RHIPSALIS Gaertner

A genus of 60 species distributed in the West Indies, Brazil, and Argentina. Represented in Nigeria by a single species.

FIGURE 4. A. *Chenopodium ambrosioides*.—A1. Habit.—A2. Flower.—A3. Sepal with stamen.—A4. Seed. B. *Celosia argentea*.—B1. Leaf.—B2. Inflorescence. C. *C. trigyna*.—C1. Leaf.—C2. Inflorescence.—C3. Flower.—C4. Flower with front sepals removed.—C5. Seed.—D. *C. laxa*, flower with front sepals removed.—E. *C. leptostachya*, inflorescence. F. *C. pseudovirgata*.—F1. Habit.—F2. Flower. G. *Amaranthus spinosus*.—G1. Habit.—G2. Cy-

Rhipsalis baccifera (J. S. Mill.) Stearn in adnot. Cact. Jour. 7: 107. 1939. *Cassytha baccifera* J. S. Mill., Illustr. Sex. Syst. Linn. Class IX. Ord. 1. 1771. TYPE: represented by the description and plate Class IX, Ord. 1. 1771 in J. S. Mill., Illustr. Sex. Syst. Linn. 1771–1777.

Rhipsalis cassutha Gaertner, Fruct. Sem. 1: 137, t. 28. 1788. TYPE: a specimen sent to Gaertner from Kew by Sir Joseph Banks, probably not preserved.

Epiphytic shrub (also growing on rocks). Stems ca. 4 mm diam., cylindrical, sometimes with shallow furrows, with paired or verticillate articulated branches, often rooting at the nodes. Branches green, glabrous, fleshy. Areoles subtended by minute scales, with 1(2) setae. Flowers bisexual, small, white or greenish yellow, lateral on the stems; sepals unequal, the outermost triangular, inner sepals 2–3 mm long, oblong, obtuse; petals absent; stamens ca. 20, as long as the sepals. Fruit 4–8 mm diam., globose or ovoid, red or white. Seed ca. 1 mm diam., black, glossy.

Specimens examined. NIGERIA. BENDEL: Benin, Sapoba Forest Reserve, near Jamieson River, common, berries whitish, ca. 4 mm diam., *W. W. Sanford 49916* (IFE). CROSS RIVER: Calabar, Ikot-Ewa-Esukbesembe foot path, in high forest, *E. Ujor* (FHI 31627). ONDO: back of Idanre rest house, flowers white, *I. B. Faremi 840* (IFE); Akure Forest Reserve, *J. Medler 353* (IFE). OYO: Ago-Owu Forest Reserve, ca. 40 mi. SE of Ibadan, fleshy epiphyte with green berries, *J. Lowe 2456* (FHI 27914, UIH 13336).

An epiphytic plant of forested areas, widely found in the tropics. Distinct in its green or grayish green, leafless stems and whitish berries. Flowering December.

COMMONLY CULTIVATED SPECIES OF CACTACEAE IN NIGERIA

Hylocerus undatus (Haw.) Britton & Rose in Britton, Fl. Bermuda 256. 1918.

Vigorous climber, with three-angled, succulent stems and large, white, scented, nocturnal flowers. Native of Central America.

Opuntia cochenillifera (L.) Mill., Gard. Dict., 8th edition. 1768, as "*O. cochinelifera.*" *Cactus cochenillifer* L., Sp. Pl. 468. 1753.

Shrub, with succulent flattened stems and branches without prickles. Flowers red with the stamens well exserted. Native of Mexico.

Opuntia sp.

Shrub with flattened or cylindrical, fleshy stems, usually with spines. Flowers showy, yellow to orange. Native of America. Often used as a hedge in village gardens.

Pereskia grandiflora Haw., Rev. P. Succ. 85. 1819.

Shrubby plant with nonsucculent, erect or straggling stems, covered with spines. Flowers showy, pink. Native of Brazil.

Additional species of Cactaceae may be found in gardens.

CHENOPODIACEAE

A family with 1,500 species, cosmopolitan in distribution, especially abundant in desert and semi-desert regions. Many species are halophytic weeds on saline soils. Poorly represented in tropical Africa, with one species in Nigeria.

1. CHENOPODIUM L.

A temperate genus with more than 200 species. Some species yield essential oils. Represented in Nigeria by a single species.

1. **Chenopodium ambrosioides** L., Sp. Pl. 219. 1753. TYPE: Mexico, Lusitania (holotype, LINN not seen). Figure 4A1–A4.

Annual or perennial aromatic herb up to 100 cm tall. Stems pubescent or glabrescent, branching profusely. Leaves alternate, 20–70 × 4–20 mm, variable in shape, from linear-oblong to ovate-oblong, margin sometimes irregularly lobed, apex obtuse to acute, base tapering into a short but distinct petiole. Leaves glandular, glands yellow-brown, ar-

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mule.—G3. Male flower.—G4. Female flower. H. *A. hybridus* var. *cruentus.*—H1. Habit.—H2. Cymule.—H3. Bract.—H4. Single male flower with front sepals removed.—H5. Single female flower. I. *A. graecizans.*—I1. Habit.—I2. Female flower.—I3. Seed. Scale bars A1, B1–2, C1–2, E, F1, G1, H1, I1 = 20 mm; D, G2 = 3 mm; C3–4, F2, G3–4, H2–5, I2–3 = 2 mm; A2–4, C5 = 1 mm.

omatic. Inflorescence a spreading panicle. Flowers sessile, inconspicuous, in axillary glomerules arranged in terminal spikes. Flowers green; sepals united below, lobes 3, somewhat concave, ca. 1 mm long; petals absent; stamens 3, antisepalous; anthers large; ovary globose; stigmas 3. Fruit an indehiscent nut. Seed reddish brown, ca. 1 mm diam., beaked.

Specimens examined. NIGERIA. CROSS RIVER: Obudu cattle ranch, edge of grassland, *J. Medler 987* (IFE). KADUNA: Zaria, Dogon bauchi, *A. O. Ohaeri 1921* (ABU). KANO: Kano, Bayero Univ. campus, weed in shady locations, *S. A. Ghazanfar 374* (BUK); Kazaure, *I. B. Faremi 975* (IFE). KWARA: Osi, Illorin, *M. O. Ajave* (FHI 19283). OGUN: Ijebu-Oru, backyard, *I. O. Okelola* (FHI 10277). OYO: Ife, back of Biology Building, *I. B. Faremi 832* (IFE). ONDO: Adanre (upper village), *D. P. M. Guile 2615* (IFE). PLATEAU: Naraguta village, savanna, *J. Olorunfemi* (FHI 56913).

Widespread in the warmer parts of the world, as a weed of shady locations. Found throughout Nigeria. Flowering May–October. Common English name: colonial galleon.

The leaves emit a strong smell, especially when crushed. Crushed leaves are used as an ointment for rheumatic pain.

AMARANTHACEAE

A large family with 65 genera and 900 species, distributed chiefly in the tropical and subtropical regions. Many species exhibit xerophytic characters and many are cosmopolitan weeds. Represented in Nigeria by 14 genera and 34 species.

KEY TO THE GENERA OF AMARANTHACEAE IN NIGERIA

1a. Flowers sterile and fertile, together in a cymule, subtended by a bract.
  2a. Leaves alternate; stamens basally free ..... 3. *DIGERA*
  2b. Leaves opposite; stamens basally connate.
    3a. Sterile flowers developing soft white filaments when plant in fruit; bracts without hooked spines; lianes or climbers ..... 8. *SERICOSTACHYS*
    3b. Sterile flowers not as above; bracts of sterile flowers with hooked spines; herbs or undershrubs, never lianes.
      4a. Staminodes present; hooked spines not set in a stellate manner ..... 6. *CYATHULA*
      4b. Staminodes absent; hooked spines in clusters of 5–20, set in a stellate manner ..... 7. *PUPALIA*
1b. Flowers fertile only, solitary, subtended by a bract and 2 bracteoles.
  5a. Seeds many ..... 1. *CELOSIA*
  5b. Seed solitary.
    6a. Leaves alternate (or opposite in *Nothosaerva*).
      7a. Flowers unisexual; inflorescence usually leafless; capsule dehiscence circumscissile or irregular ..... 2. *AMARANTHUS*
      7b. Flowers bisexual; inflorescence usually leafy; capsule dehiscence irregular.
        8a. Stamens 5; staminodes present; sepals 5 ..... 4. *AERVA*
        8b. Stamens 1–2; staminodes absent; sepals 3–4(5) ..... 5. *NOTHOSAERVA*
    6b. Leaves opposite.
      9a. Anthers 2-celled.
        10a. Bracteoles orbicular, not spinous. Aquatic or subaquatic ..... 11. *CENTROSTACHYS*
        10b. Bracteoles lanceolate, spinous. Terrestrial.
          11a. Inflorescence subtended by foliaceous bracts; flowers not reflexed in fruit; leaves sessile or subsessile ..... 9. *PANDIAKA*
          11b. Inflorescence not subtended by foliaceous bracts; flowers reflexed in fruit; leaves petiolate ..... 10. *ACHYRANTHES*
      9b. Anthers 1-celled.
        12a. Filaments fused to form a tube, 5-lobed at the apex, with the anthers in between the lobes; plant white-villous ..... 13. *GOMPHRENA*
        12b. Filaments fused at the base only; plant glabrous or pubescent.
          13a. Plant glabrous; spikes pedunculate; staminodes absent. Maritime 12. *BLUTAPARON*
          13b. Plant pubescent; spikes sessile; staminodes present. Not maritime ..... 14. *ALTERNANTHERA*

1. CELOSIA L.

A genus with 60 tropical and temperate species. Represented in Nigeria by six species.

KEY TO THE SPECIES OF *CELOSIA* IN NIGERIA

1a. Flowers in axillary, ovoid-globose heads ..... 6. *C. globosa*
1b. Flowers in long terminal or axillary spikes.
2a. Spikes interrupted.
3a. Sepals 4–5 mm long; stems usually glossy, red to purple at the base ..... 3. *C. laxa*
3b. Sepals 2–3 mm long; stems not as above.
4a. Stems weak, often straggling; stigmas 2; leaves 42–75 × 16–42 mm; petiole ca. 120 mm long ..... 5. *C. leptostachya*
4b. Stems 4-angled, not weak; stigmas 3; leaves 20–80 × 10–30 mm; petiole 10–15 mm long ..... 2. *C. trigyna*
2b. Spikes not interrupted.
5a. Sepals 6–10 mm long; plant not stoloniferous ..... 1. *C. argentea*
5b. Sepals 2–2.5 mm long; plant stoloniferous ..... 4. *C. pseudovirgata*

1. **Celosia argentea** L., Sp. Pl. 205. 1753. TYPE: America, *Linnean specimen 288/1* (holotype, LINN). Figure 4B1–B2.

C. debilis S. Moore in J. B. 54: 291. 1916. TYPE: Uganda. Mengo District: Kayabana, *Drummer 2647* (holotype, BM not seen).

Annual herb 60–100 cm tall. Stems simple or branched, sometimes woody. Leaves alternate, glabrous, up to 100 × 15 mm, narrowly elliptic to linear-lanceolate, apex sharply acute with an excurrent midrib, base tapering into the petiole. Flowers in clusters arranged in bracteate spikes up to 10 cm long. Bracteoles 2. Bracts and bracteoles lanceolate or deltoid, hyaline, persistent. Sepals 5, free, equal, white or yellow, tinged pink, 6–10 mm long, linear-lanceolate, mucronate, with wide hyaline margins; stamens 5, the filaments expanded at the base and united; style 3–7 mm long; stigmas 2–3. Capsule 4–5 mm diam., globose to ovoid. Seeds 1–1.5 mm diam., black, testa finely reticulate.

Additional specimens examined. NIGERIA. ANAMBRA: Enugu, Iva Forest Reserve, *J. A. Emiogbon* (FHI 65714). BENDEL: Ubaija-Okhussan Forest Reserve, *T. K. Odewo & Oni* (FHI 80065). KADUNA: Zaria, weed of cultivated land, *T. C. N. Baker 988* (ABU). KWARA: Shagunu Research Station, inflorescence whitish pink, *I. B. Faremi 1555* (IFE). OGUN: Aiyetoro, high forest, *Magbagbeola et al.* (FHI 94595). OYO: Univ. of Ife Campus, *I. B. Faremi s.n.* (IFE); Ibadan, *D. P. M. Guile 181* (IFE).

A pantropical weed of dry habitats, probably introduced in Africa, now naturalized. Found throughout Nigeria. Flowering August–March. Hausa: *Farar alayyahoo*; Yoruba: *Sokoyokoto*.

The leaves are used as a vegetable, and the species is sometimes cultivated ornamentally. Selections of *C. argentea* f. *cristata* (L.) Schinz, "cockscomb," are commonly cultivated for their fasciated inflorescences. The flowering heads are red or yellow.

2. **Celosia trigyna** L., Mant. Pl. 212. 1771. TYPE: Senegal: Linnean specimen (holotype, S not seen). Figure 4C1–C5.

Celosia melanocarpos Poir., Encycl. Meth. Suppl. 4: 318. 1816. TYPE: Senegal, *Coll. ignot.* (holotype, P not seen).

Annual herb with erect, straggling, or decumbent, 4-angled stems 30–80 cm long. Leaves alternate, 20–80 × 10–30 mm, ovate to narrowly ovate, glabrous, apex acute, base tapering into a petiole 10–25 mm long. Spikes cylindrical, narrow, axillary or terminal, interrupted. Sepals free, 2–3 mm long, white; petals absent; stamens pink, the filaments basally connate; style shorter than 0.5 mm; stigmas 3. Seed black, glossy, 1 mm diam., flattened, with faint reticulate markings on the faces.

Specimens examined. NIGERIA. CROSS RIVER: Ikom, *Ekwuno et al.* (FHI 95952). IMO: Bende Forest Reserve, *Ekwuno et al.* (FHI 95687). KADUNA: Zaria, agronomy farm, ABU, *T. C. N. Baker 667* (ABU). ONDO: Ikole, secondary forest, *J. Olorunfemi & S. T. Oguntayo* (FHI 91878). OYO: in front of Igbetti mining industry rest house, *I. B. Faremi 1179* (IFE); Ibadan, *D. M. P. Guile 187* (IFE); Ife Campus, *J. B. Hall 1159* (IFE); Shaki, along bush immediately after Agbedegun river, *Zac. Gbile & J. Olorunfemi* (FHI 20471; IFE).

A common weed of forest and savanna woodlands, open waste places, and cultivated land. Widespread in tropical Africa. Flowering July, September–December. Yoruba: *Ajefowo*.

3. **Celosia laxa** Schum. & Thonn., K. Danske Vid. Selsk. Nat. Mat. Afhandl. 3: 161. 1828. TYPE: Guinea: *Thonning s.n.* (holotype, C not seen). Figure 4D.

Straggling undershrub. Stems up to 100 cm or longer, glossy, red to purple at the base. Leaves alternate, up to 60 × 22 mm, glabrous, ovate to ovate-lanceolate, apex acute, base tapering into the

petiole. Spikes terminal and axillary, interrupted. Sepals 5, free, white to pale yellow, 4–5 mm long, lanceolate, mucronate; petals absent; filaments basally united into a short tube; style short; stigmas 3. Seed 1 mm diam., flattened, suborbicular, black glossy, with reticulate markings on the faces.

Specimens examined. NIGERIA. OGUN: Abeokuta, Olokemeji Forest Reservation, *P. Wit, Leuwenberg & J. Olorunfemi* (FHI 66925). ONDO: Akure, lowland rain forest, *Z. Gbile, J. Olorunfemi & A. Binuyo* (FHI 20569); Igbara-Odo, Oruwo stream, on bank, *J. Olorunfemi & I. B. Faremi* (FHI 70749). OYO: Ife Univ. campus, Ibadan, *D. P. M. Guile 185* (IFE).

A plant of forested areas, found in the southern part of Nigeria. Flowering March–August, November. Hausa: *Nannafaa.*

Celosia laxa is similar to *C. trigyna* vegetatively but can be distinguished by having smaller sepals. *Celosia laxa* is restricted to the moister parts of Nigeria. The leaves and stems are often tinged purple.

4. **Celosia pseudovirgata** Schinz, Viert. Nat. Ges. Zurich 57: 537. 1912. TYPE: Locality unknown, *Ledermann 5886* (holotype, Z not seen). Figure 4F1–F2.

C. bonnivairii auct. *non* Schinz, Keay in Fl. West Trop. Afr. 2nd edition 1(1): 147. 1954.

Stoloniferous herb up to 60 cm tall. Stems dark green, glabrous. Leaves alternate, glabrous, dark green above, pale beneath, 35–36 × 20–35 mm, ovate, apex acute, base tapering into a petiole 22–42 mm long, often tinged purple. Inflorescence branched. Spikes straw-colored, terminal. Bracteoles lanceolate. Sepals 2–2.5 mm long, lanceolate, 1-nerved; petals absent; stamens 2 mm long, included; ovary and style included in the sepals.

Specimens examined. NIGERIA. BENDEL: Benin, Okomu Forest Reserve, compound No. 86, *Brenan 8839* (FHI 56550). ONDO: Ondo, Okelifi, ca. 2 mi. S of Ondo, *C. F. A. Onochie* (FHI 34230).

Not common. A plant of forest areas. Not collected since C. F. A. Onochie's collection FHI 34230 in 1954. Perhaps overlooked. Flowering November–January.

5. **Celosia leptostachya** Benth. in Hook., Nig. Fl. 491. 1849. TYPE: Fernando Po, *Vogel s.n.* (holotype, K). Figure 4E.

Annual herb up to 1 m tall. Stems weak, sometimes straggling, glabrous. Leaves alternate, 42–75 × 16–42 mm, ovate-lanceolate to narrow-lanceolate, apex subacute, base tapering into a petiole ca. 120 mm long. Inflorescence interrupted, composed of long terminal or axillary spikes. Bracteoles and sepals brownish in dry material. Sepals 5, free, 2–3 mm long, oblong-elliptic, 1-nerved; petals absent; style short; Stigmas 2. Capsule included in the sepals.

Additional specimens examined. NIGERIA. CROSS RIVER: Calabar, *A. Emuiogbon* (FHI 060239). IMO: Ohaji Forest Reserve, *Ekwuno et al.* (FHI 95566); N.E. Baissa Forest Reserve, *Ekwuno* (FHI 76948). ONDO: Irele–Ore rd., high forest, *J. Olorunfemi, A. Binuyo & Babagbemi* (FHI 96725).

A weak herb, often with straggling stems, sometimes rooting at the nodes. Found in high forest in southern Nigeria. Distinct in its long, interrupted inflorescences. Flowering August–November.

6. **Celosia globosa** Schinz in Viert. Nat. Ges. Zurich 76: 137. 1931. TYPE: Zaire: Likini, *Goossens 4719* (holotype, BR not seen).

Annual herb 40–70 cm tall, stems woody, glabrous. Leaves similar to those of *C. pseudovirgata* but larger, being up to 90 × 40 mm. Inflorescence unbranched, ca. 12 mm long, forming ovoid-globose heads, usually axillary. Flowers straw-colored; sepals 5, free, ca. 4 mm, elliptic-lanceolate; petals absent; stigmas 3.

Hutchinson & Dalziel (1954), in *Flora of West Tropical Africa*, cited a specimen from southern Nigeria, Oban (Cross River State), *Talbot 1283.* The only specimen present at FHI is from Cameroon, Kumba, *J. Olorunfemi* (FHI 30697). More collections are required to confirm the record from Oban. Flowering July.

2. AMARANTHUS L.

A genus with 50 species distributed in tropical, subtropical, and temperate regions. Represented in Nigeria by six species.

The leaves of many species are used as potherbs, and some are eaten as spinach.

KEY TO THE SPECIES OF *AMARANTHUS* IN NIGERIA

1a. Paired spines present in the axils of leaves and branches; terminal spikes with paired spines at the base _____ 1. *A. spinosus*

1b. Spines absent.
2a. Sepals 3.
3a. Spikes short, all axillary, present throughout the length of the shoot; capsule dehiscence circumscissile ..... 4. *A. graecizans*
3b. Spikes elongated, terminal and axillary, usually present in the upper part of the shoot; capsule rupturing irregularly.
4a. Capsule rugose; spikes often paniculate ..... 5. *A. viridis*
4b. Capsule smooth; spikes not paniculate ..... 6. *A. lividus*
2b. Sepals 5.
5a. Male and female flowers intermixed in the spikes; outer sepals lanceolate, acute-aristate ..... 2. *A. hybridis* subsp. *cruentus*
5b. Lower spikes with usually only female flowers; sepals oblong to spathulate-oblong, obtuse ..... 3. *A. dubius*

1. **Amaranthus spinosus** L., Sp. Pl. 991. 1753. TYPE: India: *Linnean specimen no. 117/27* (holotype, LINN not seen). Figure 4G1–G4.

Annual herb. Stems erect, 30–100 cm tall, branched, woody at the base, glabrous below, pubescent above. A pair of spines present in the axils of leaves and branches. Leaves alternate, 20–50 × 10–17 mm, ovate to lanceolate, apex often retuse with a small mucro in the middle, base tapering into a long or short petiole. Spikes terminal and axillary; terminal spikes 7–12 cm long, with a pair of spines at the base of flower clusters; axillary spikes shorter, without paired spines. Male flowers at the top of the spike, female below. Bracts and bracteoles deltoid, membranous, with an excurrent midrib. Flowers unisexual, small, green, bracteolate. Female flower: sepals 5, 1.5–2 mm long, oblong, with a sharp spiny tip, petals absent. Male flower: sepals similar in size to those of the female flower, lanceolate, acute; petals absent; stigmas 3. Capsule ca. 1.5 mm diam., ovoid, dehiscence circumscissile. Seed 1, 0.75–1 mm diam., black, shiny, compressed, obscurely reticulate.

Specimens examined. NIGERIA. BORNO: Zago Forest Reserve, flowers cream, *Ekwuno & Fagbemi* (FHI 93901). CROSS RIVER: Obubu Cattle Ranch, 5,500 ft., *J. Medler 969* (IFE). GONGOLA: Mambilla Plateau, 5,500 ft., *H. M. Chapman 53* (FHI 70853). KADUNA: Zaria, Ahmadu Bello Univ. *T. C. N. Baker 585* (ABU). KANO: Kano, near junior staff quarters, Bayero Univ., *S. A. Ghazanfar s.n.* (BUK). LAGOS: Badagry, Ikoga–Badagry rd., *S. T. Oguntayo & Adejimi STO 235* (IFE). ONDO: Ore–Omotosho rd., high forest, stem deep red, *Ibhanesebhor & Osanyinlusi* (FHI 97241). OYO: Univ. of Ife campus, *D. P. M. Guile s.n.* (IFE). PLATEAU: Dutsen Pedong, Panyam area, *J. B. Hall 2232* (IFE, K).

Widespread throughout the warm tropical and subtropical regions. A common weed of cultivated land and waste places. Found throughout Nigeria, ascending to 1,700 m. Flowering June–September. Hausa: *Nanigin zaki-banza.*

2. **Amaranthus hybridus** L. subsp. **cruentus** (L.) Thell., Fl. Adv. Montpellier. 205. 1912.

A. cruentus L., Syst. Nat., 10th edition, 2: 1269. 1759. TYPE: *Linnean specimen 1117/25* (holotype, LINN not seen). Figure 4H1–H5.

A. paniculatus L., Sp. Pl., 2nd edition. 1406. 1763.

Herb up to 0.5 m tall, woody at base. Stems and branches few. Leaves alternate, variable in size, glabrous, 30–100 × 15–40 mm, ovate-lanceolate to elliptic, apex acute, base cuneate, often unequal. Petiole 20–50 mm long, slender. Flowers in long, branched terminal or axillary spikes. Bracts and bracteoles deltoid-ovate, pale-membranous, midrib green, excurrent and extending beyond the sepals into a stout, spinose arista. Flowers unisexual with male and female flowers mixed together in the spike, greenish; sepals 5, 2–2.5 mm, lanceolate, the outer segments acute-aristate, the inner often acute; sepals usually oblong-lanceolate and acute in female flowers; petals absent; stigmas 2–3. Capsule subglobose to ovoid, 2–3 mm diam., circumscissile. Seed 1, 1.0–1.25 mm diam., black, shining, compressed, faintly reticulate around the margins.

Specimens examined. NIGERIA. BENDEL: Etsako, *T. K. Odewo & Oni* (FHI 79154). GONGOLA: Gashaka, *T. K. Odewo* (FHI 87886). OYO: Ife University, base of Hill 3, *I. B. Faremi 1584* (IFE); Ibadan, *J. Lowe 1910* (FHI, K, IFE); Aponmu, *Oyayomi & Osayinlusi* (FHI 83002).

Widespread in tropical Africa. Occurs as a weed throughout Nigeria but not common. Commonly cultivated and cooked as spinach. Flowering June–November. Hausa: *Namigin gaasayaa.*

3. **Amaranthus dubius** Martius ex Thell., Fl. Adv. Montpellier. 203. 1912. TYPE: "ex horto Erlangensi," ex herb. *Schwaegrichen* (neotype, M, Townsend, Kew Bull. 29: 471. 1974, not seen).

[*Amaranthus dubius* Martius, Pl. Hort. Acad. Erlang. 197. 1814, nomen nudum.]
[*A. tristis* Moq. in DC., Prodr. 13(2): 260. 1849, non L.]

Annual herb. Stems erect, up to 100 cm tall, branched, glabrous below, pubescent above. Leaves glabrous or pubescent, 15–90 × 10–50 mm, ovate, apex obtuse or sometimes retuse, with a mucro, base cuneate; petiole up to 85 mm long. Flowers in axillary, simple or branched spikes. Lower spikes usually female. Bracts and bracteoles deltoid-ovate, membranous, with a green midrib, extending into a spinose arista, extending beyond the sepals. Bracteole equal to or shorter than the sepals. Flowers green; sepals 1.5–2.5 mm long, narrowly oblong or spathulate-oblong, obtuse or acute in the female flower, lanceolate, acuminate, in the male flower, 1-nerved; petals absent; stigmas 3. Capsule ovoid-urceolate, circumscissile. Seed 1, 1–1.25 mm diam., black, compressed, faintly reticulate.

Specimen examined. NIGERIA. OYO: Bida-Mokwa, *G. Jackson 28470* (UCI 11982), harvested from cattle dung.

Except for the specimen cited above, which was harvested from cattle dung, no other material is present in Nigeria. Hutchinson & Dalziel (1954) cited a collection from Lagos, *Newberry 142*, which I have not seen. More collections are required to confirm the record from Nigeria. *Amaranthus dubius* resembles *Amaranthus spinosus* but differs by the lack of spines; from *A. viridis* it can be distinguished by its capsule dehiscence and morphology, which is less rugose and shows circumscissile dehiscence.

Widespread in tropical Africa. Not common in Nigeria.

4. **Amaranthus graecizans** L., Sp. Pl. 990. 1753. *A. blitum* L. var. *graecizans* (L.) Moq. in DC., Prodr. 13(2): 263. 1849. TYPE: U.S.A. Virginia: *Linnean specimen 1117/3* (holotype, LINN not seen). Figure 4I1–I3.

[*Amaranthus angustifolius* Lam., Encycl. 1: 115. 1783, nom. illegit.]

Annual herb. Stems erect to ascending up to 30 cm long, glabrous, much branched. Leaves alternate, 15–25 × 4–5 mm, glabrous or sometimes sparsely pubescent on the veins, oblong, apex obtuse or retuse, with an excurrent midrib, base tapering into a long petiole. Flowers in congested short spikes, these in the axils of leaves throughout the length of the shoots. Male and female flowers intermixed. Bracts and bracteoles narrow-lanceolate, acuminate, with the midrib forming an arista, pale-membranous, midrib green; bracteoles usually shorter than the sepals. Flowers unisexual, greenish; sepals 3(4), 1.5 mm long, those of the male flower lanceolate, cuspidate, membranous; those of the female flower lanceolate to oblong, mucronate; petals absent; stigmas 3 in female flowers. Capsule 2–2.5 mm diam., globose to ovoid, slightly exceeding the sepals, rupturing irregularly or sometimes indehiscent. Seed 1–1.25 mm diam., black, faintly reticulate.

Specimens examined. NIGERIA. GONGOLA: Gembu, fruits reddish, *B. O. Daramola* (FHI 84587); Mambilla Plateau, *Z. Gbile, P. Witt & B. O. Daramola* (FHI 65562). KWARA: Lokoja, slope of Patti Hill, *Z. O. Gbile & P. Wit* (FHI 65883); Ilorin, Shagunu Research Station, bank of Lake Kainji, *I. B. Faremi 286* (IFE). OYO: Igbetti, open cultivated land, *I. B. Faremi 1200* (IFE). SOKOTO: Talata Mafara, by roadside, *M. G. Latilo* (FHI 62800).

Widespread in tropical Africa. A common weed of cultivated land and waste places. Found throughout Nigeria. Flowering May–December. Hausa: *Namigin gaasayaa.*

5. **Amaranthus viridis** L., Sp. Pl., 2nd edition. 1405. 1763. TYPE: *Linnean specimen 1117/15* (holotype, LINN not seen).

Amaranthus gracilis Poir., Lam. Encycl. Suppl. 1: 312. 1810. TYPE: same as above.

Annual herb. Stems branched, erect to ascending up to 1 m long, glabrous or sparsely pubescent. Leaves alternate, very variable in size, glabrous or pubescent on the lower surface; petiole 10–70 mm long. Leaves 28–80 × 14–55 mm, deltoid-ovate to elliptic or broadly ovate, apex obtuse or retuse with the midrib projecting, base cuneate and sometimes unequal. Flowers in often paniculate, axillary or terminal spikes. Male and female flowers intermixed. Bracts and bracteoles deltoid, membranous, with an excurrent midrib forming a short awn. Flowers unisexual, small, green; sepals 3; those of the male flower ca. 1.5 mm long, oblong-ovate, mucronate, concave; those of the female flower 1.5–1.75 mm long, oblong, with membranous margins; petals absent; stigmas 2–3 in female flowers. Capsule ca. 1.5 mm long, subglobose, rugose, rupturing irregularly. Seed 1–1.25 mm diam., globose, black or dark brown, reticulate.

Specimens examined. NIGERIA. IMO: Bende Forest Reserve, *Ekwuno et al.* (FHI 15662). OYO: Ife, *D. P. M. Guile s.n.* (IFE).

Found throughout the tropical and subtropical regions of the world. A very common weed in cultivated areas by roadsides and disturbed places throughout Nigeria. Cultivated for its leaves, which are cooked and eaten as spinach. Flowering more or less throughout the year. Hausa: *Namijin gaasayaa.*

6. **Amaranthus lividus** L., Sp. Pl. 990. 1753. TYPE: 18th century cultivated material (neotype, BM, Townsend, Kew Bull. 29: 472. 1974, not seen).

A. blitum L., Sp. Pl. 990. 1753, nomen ambiguum. TYPE: *Linnean specimen 1117/4* (lectotype, LINN not seen).

Annual herb up to 60 cm tall. Stems erect to ascending, simple or branched, angular, sometimes reddish. Leaves alternate, glabrous or very sparsely pubescent, 10–70 × 5–62 mm, ovate to broadly ovate to rhomboid-ovate, apex emarginate, base shortly cuneate, long-petiolate; petiole often longer than the lamina. Flowers in terminal and axillary spikes and cymose clusters, the male and female intermixed. Bracts and bracteoles ovate to lanceolate, mucronate, membranous, with a short, yellowish mucro formed by the excurrent midrib. Flowers unisexual, green; sepals 3(4), 1–2 mm long, lanceolate to spathulate, mucronate, in the female flower often obtuse; stigmas 2–3 in female flowers; petals absent. Capsule 1.25–2 mm diam., subglobose, compressed, smooth, exceeding the sepals, rupturing irregularly or sometimes indehiscent. Seed 1.0–1.75 mm diam., globose, compressed, dark brown to black, reticulate in the center.

Specimen examined. NIGERIA. ANAMBRA: Onitsha, *Barter 539* (K).

Widespread in tropical Africa, uncommon in Nigeria. I have seen no material other than the specimen cited. Flowering May–December.

CULTIVATED SPECIES OF *AMARANTHUS* IN NIGERIA

1. **Amaranthus tricolor** L., Sp. Pl. 989. 1753.

Annual herb with profusely branching stems. Flowers greenish crimson, in globose clusters.

Not commonly cultivated in Nigeria. The leaves are cooked as spinach. Flowering May–December.

2. **Amaranthus caudatus** L., Sp. Pl. 990. 1753.

Annual herb, ca. 40 cm tall. Stems and leaves reddish. Flowers in axillary and terminal, red or greenish red spikes, the terminal spikes pendulous.

Cultivated in gardens for ornament. Flowering November.

3. DIGERA Forsskal

Monotypic genus. Widespread in central and eastern Africa, Arabia, and Asia.

1. **Digera muricata** (L.) Martius, Nov. Act. Acad. Caes. Leop.-Carol. 13(1): 285. 1826. *Achyranthes muricata* L., Sp. Pl., 2nd edition. 295. 1762. TYPE: *Linnean specimen 287/6* (lectotype, LINN not seen).

Achyranthes alternifolia L., Mant. 50. 1767. *Digera alternifolia* (L.) Asch. in Schweinf., Beitr. Fl. Aethiop. 180. 1867. TYPE: *Linnean specimen 287/7 (lectotype, LINN not seen).*

Digera arvensis Forsskal, Fl. Aegypt.-Arab. 65. 1775. TYPE: Herb. Forsskal, Cent. 3 No. 7 (holotype, C not seen).

Annual herb up to 70 cm tall. Stems branched, erect to ascending, glabrous to sparsely pilose. Leaves alternate, glabrous to sparingly pilose, 35–70 × 10–30 mm, lanceolate to ovate; petiole 10–20 mm long. Flowers in axillary, bracteate spikes. Bracts persistent, ovate-lanceolate, glabrous, each subtending a sessile or subsessile cluster of 3 flowers. Central flower fertile. Lateral flowers reduced (sometimes absent) or modified into accrescent scales with wide or narrow lateral lobes; sterile flowers 1-bracteolate. Fertile flowers bisexual, small, white, tinged pink or red; sepals (perianth) 4–5, persistent, 4–5 mm long, elliptic, the outer 2 opposite longer than and covering the inner segments. Petals absent; stamens 4–5, free; anthers 2-celled; staminodes absent; style slender; stigmas 2. Fruit 2–2.5 mm diam., subglobose, indehiscent, verrucate, enclosed by the persistent sepals, falling entire with the sterile flowers. Seed solitary.

Hutchinson & Dalziel (1954) cited a specimen from Ondo State, Abwa Forest Reserve, *Jones* (FHI 7077), which I was not able to find at FHI.

Though reportedly widespread in central and eastern Africa, this species has been collected only once from southern Nigeria. It is a weed, normally occurring in cultivated areas and fields. Flowering October.

4. AERVA Forsskal

A small genus of 10 species distributed in temperate and tropical Africa and Asia. Represented in Nigeria by two species.

KEY TO THE SPECIES OF *AERVA* IN NIGERIA

1a. Flowers unisexual; outer sepals oblong-ovate or ovate, lanate in female flowers; leaves linear to linear-lanceolate ..... 1. *A. javanica*

1b. Flowers bisexual; outer sepals lanceolate, tomentose; leaves elliptic ..... 2. *A. lanata*

1. **Aerva javanica** (Burm. f.) Juss. ex Schult., Syst. Veg., 15th edition, 5: 565. 1819. *Ire-*

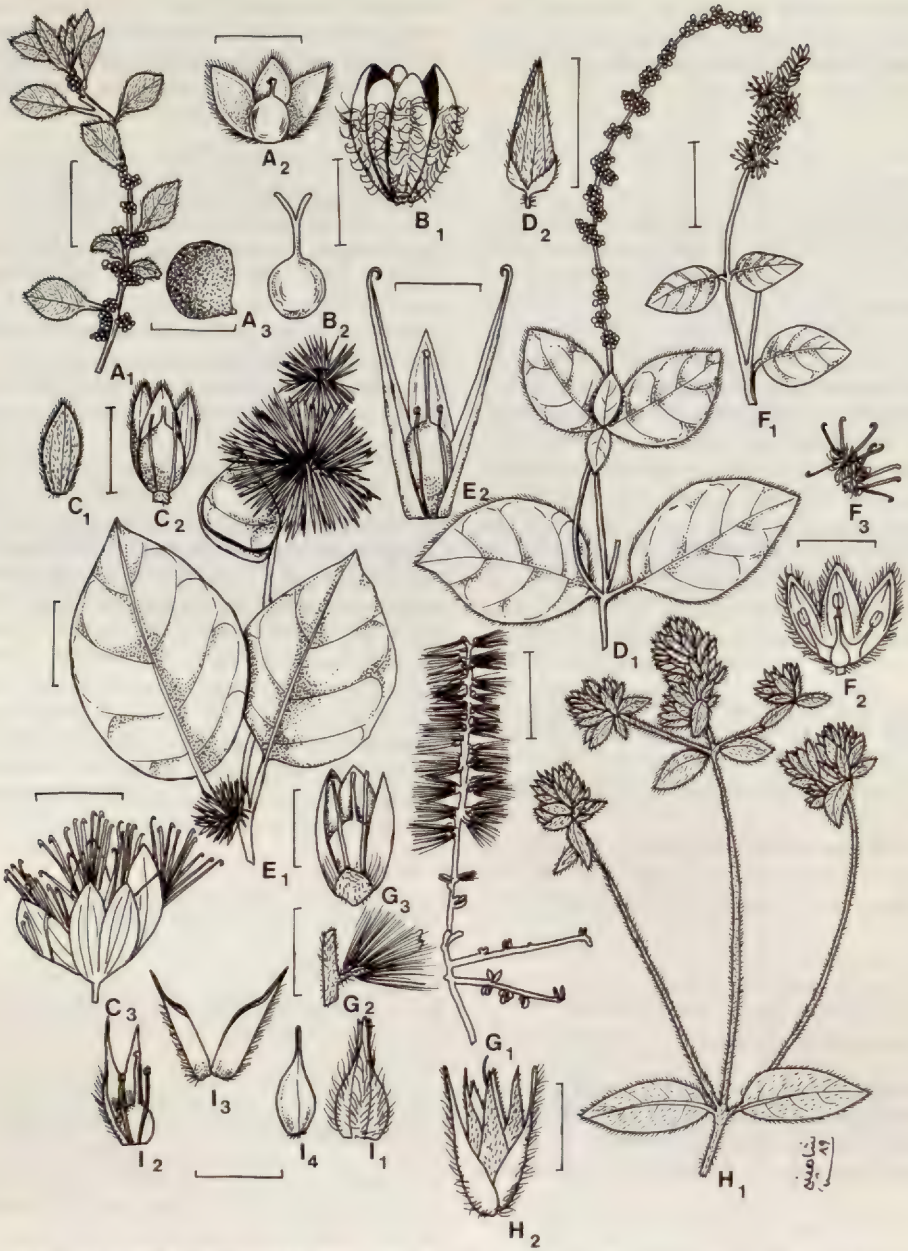

FIGURE 5. A. *Aerva lanata*.—A1. Habit.—A2. Flower.—A3. Seed. B. *A. javanica*.—B1. Female flower.—B2. Gynoecium. C. *Cyathula prostrata*.—C1. Sepal.—C2. Flower with front sepals removed.—C3. Cymule. D. *C. pedicellata*.—D1. Habit.—D2. Flower. E. *C. uncinulata*.—E1. Habit.—E2. Flower with front sepals removed. F. *Pupalia lappacea*.—F1. Habit.—F2. Flower.—F3. Hooked bracts, enlarged. G. *Sericostachys scandens*.—G1. Habit with mature inflorescence.—G2. Cymule.—G3. Fertile flower with front sepals removed. H. *Pandiaka involucrata*.—H1. Habit.—H2. Flower. I. *P. angustifolia*.—I1. Flower.—I2. Flower with front sepals removed.—I3. Bracteoles.—I4. Bract. Scale bars A1, D1, E1, F1, G1, H1 = 20 mm; G2, H2, I1–4 = 5 mm; F2, G3 = 3 mm; B1–2, C1–3, D2, E2 = 2 mm; A2–3 = 1 mm.

sine javanica Burm. f. Fl. Ind. 212 (sphalm 312), t. 65/2. 1768. TYPE: in Herb. Burmann (holotype, G, alleged to have come from Java, but the species is unknown there, not seen). Figure 5B1–B2.

Iresine persica Burm. f., Fl. Ind. 212, t. 65/1, f. 2. 1768. TYPE: Iran: Herb. Burmann (holotype, G not seen).

Celosia lanata L., Sp. Pl. 205. 1753. TYPE: habitat in Zeylona, *Hermann Herbarium*, Volume 4, p. 52, left-hand specimen (lectotype, BM not seen).

Aerva tomentosa Forsskal, Fl. Aegypt.-Arab. 122: 170. 1775. TYPE: Egypt: *Forsskal* (lectotype, C not seen).

Robust herb or often woody, 30–100 cm tall. Stems branched from the base. Stems and branches striate, whitish gray tomentose. Leaves alternate, variable in shape and size, 30–65(–80) × 8–16 (–35) mm, linear to linear-lanceolate, apex acute, base tapering into a short petiole; leaves sometimes plicate, densely white-gray tomentose. Stems and branches leafless in the upper part. Inflorescence grayish, of terminal spikes, arranged in panicles and sometimes interrupted with lateral flower clusters. Male and female flowers in separate spikes. Flowers bracteate. Bracts triangular, densely lanate, persistent; bracteoles similar to the bracts, persistent. Female flowers: outer 2 sepals 2–3 mm long, oblong-ovate, obtuse or acute; inner 3 sepals slightly shorter than the outer ones, elliptic, acute, lanate, with a distinct green vitta in the middle. Male flower: sepals 1.4–2.0 mm long, ovate; petals absent; anthers equalling the sepals. Capsule ca. 1.5 mm diam., compressed, globose, dehiscing irregularly. Seed ca. 1.0 mm diam., rounded, somewhat compressed, dark brown, shining, usually smooth.

Specimens examined. NIGERIA. BORNO: Maiduguri, open savanna, *M. G. Latilo, Okeke & T. K. Odewo* (FHI 69408); Kukawa, Wumri, *Ekwuno & Fagbemi EF 289* (FHI); Baga Seyoram, *J. T. Davey* (FHI 27129, K). SOKOTO: Gedon village, *M. G. Latilo* (FHI 62770).

Found in the northern, arid areas of the country. Flowering January–August. Hausa: *Furfura ta fatumi*.

2. **Aerva lanata** (L.) Juss. ex Schult., Syst. Veg. 15th edition, 5: 565. 1819. *Achyranthes lanata* L., Sp. Pl. 204. 1753. TYPE: India: *Linnean specimen 290/6* (lectotype, LINN not seen). Figure 5A1–A3.

Aerva elegans Moq. in DC., Prodr. 13(2): 303. 1849.
Achyranthes villosa Forsskal, Fl. Aegypt.-Arab. 48. 1775. TYPE: Forsskal herbarium 203 (holotype, C not seen).

Straggling herb up to 60 cm tall. Branches diffuse, somewhat woody, densely white-lanate. Leaves alternate, white-tomentose, 15–40 × 10–25 mm, ovate-elliptic, apex acute; petiole up to 2 cm long. Leaves smaller in size towards the apex. Flowers in long or short axillary spikes; inflorescence axis white-tomentose. Bracts ca. 1 mm long, deltoid, membranous, white pilose, persistent; bracteoles similar to bracts, persistent. Flowers bisexual, small, white to creamy; sepals 1–1.5 mm long, densely white-lanate dorsally; the outer 2 lanceolate, acuminate with an excurrent midrib; inner 3 smaller, acute with a broad green vitta along the midrib; petals absent; filaments basally united; stigmas 2. Capsule ca. 1 mm diam., globose. Seed solitary, ca. 0.75 mm diam., subreniform, black, shining, faintly reticulate around the margins.

Specimens examined. NIGERIA. BENDEL: Atuagbo, Irrua Forest, *Ekwuno et al.* (FHI 95335). BORNO: Kukawa, Wimiri Forest Reserve, *Ekwuno & Fagbemi* (FHI 94040); Berga, Baga–Maiduguri rd., *Soladoye, Ekwuno & Ihe* (FHI 83590). ONDO: Ise-Ekiti, *J. Olorunfemi & Fagbemi* (FHI 70736, ABU). OYO: Ibadan, above Eleiyele reservoir, *J. Lowe 2053* (UCI 12040, K).

Widespread in tropical Africa. Found in dry and moist localities in Nigeria. Common. Flowering March–September.

5. NOTHOSAERVA Wight

A monotypic genus distributed in tropical Africa and Asia.

Nothosaerva brachiata (L.) Wight, Icon. Pl. Ind. 6: 1. 1853. *Achyranthes brachiata* L., Mant. 50. 1767. *Aerva brachiata* (L.) Martius in Nov. Act. Acad. Caes.-Leop. Carol. 13(1): 291. 1826. TYPE: *Linnean specimen 290/1* (holotype, LINN not seen).

Annual herb 10–40 cm tall. Branches many, striate, spreading, glabrous. Leaves opposite or alternate, 15–35 × ca. 17 cm, elliptic to ovate-oblong, almost glabrous, apex obtuse, base narrowing into a petiole. Flowers in axillary, sessile spikes; often the spikes in clusters or solitary. Bracts ca. 0.5 mm long, hyaline, concave, acute, glabrous. Bracteoles minute, scarious. Bracts and bracteoles persistent. Flowers bisexual; sepals 3–4(5), ca. 1 mm long, ovate, shortly acuminate, villous on the outer surface, with a green vitta along ⅔ the length of the midrib; petals absent; stamens 1–2; filaments free; anthers 2-celled; staminodes absent; style short; stigma capitate. Capsule rupturing irregularly, falling entire with the persistent sepals and bracts. Seed solitary, rounded, compressed, smooth, and shining.

Collected from Borno State, Kukawa, *E. Vogel 7* (K), from northern Nigeria (cited by Hutchinson & Dalziel, 1954). There are no specimens from Nigeria at FHI or other herbaria. The only specimen I have seen is from Senegal in West Africa. The record of this species in Kukawa needs confirmation.

6. CYATHULA Blume

A genus of 25 species distributed in tropical regions, and represented in Nigeria by four species.

KEY TO THE SPECIES OF *CYATHULA* IN NIGERIA

1a. Cymules forming globose heads; outer sepals with a long acuminate apex ending in a curved hook ..... 4. *C. uncinulata*

1b. Cymules in short or elongated spikes; outer sepals not as above.

2a. Cymules with 1 fertile flower; bracts acute at apex; sepals 3.5–4 mm long ..... 3. *C. achyranthoides*

2b. Cymules with 2–3 fertile flowers; bracts long-acuminate or mucronate at apex; sepals 2–3 mm long.

3a. Leaves pilose on margins and surfaces; stem erect to ascending, not rooting at the nodes; fruiting cymules deflexed ..... 1. *C. prostrata*

3b. Leaves pubescent on margins, upper surface, and nerves, glabrous below; stem ascending to prostrate, rooting at the nodes; fruiting cymules patent ..... 2. *C. pedicellata*

1. **Cyathula prostrata** (L.) Blume, Bijdr. 549. 1825. *Pupalia prostrata* (L.) Martius, Nov. Act. Acad. Caes. Leop.-Carol. 13(1): 321. 1826. *Achyranthes prostrata* L., Sp. Pl., 2nd edition. 296. 1762. TYPE: *Linnean specimen 287/13* (lectotype, LINN not seen). Figure 5C1–C3.

Annual or perennial herb. Stems erect to ascending, 20–50 cm tall, slender, weak, branched, glabrous or pilose (especially at the nodes). Leaves opposite, 37–45 × 21–25 mm, broadly ovate, apex acute or shortly acuminate, base cuneate, petiolate; leaves and petiole pilose. Inflorescence spicate, with the fertile and sterile flowers present in cymules. Each cymule with 2 outer sterile and 3 inner fertile flowers. Cymules lax, deflexed in fruit. Bracts and bracteoles 1.5–2 mm long, lanceolate-ovate, apex long-acuminate or mucronate, ciliate. Lateral modified flowers with many hooked spines, reddish. Sepals 5, 2–3 mm long, elliptic-oblong, 3-nerved, densely white-pilose; petals absent; filaments slender, basally connate; staminodes expanded basally, alternating with stamens. Capsule ca. 1.5 mm diam., ovoid, rupturing irregularly. Seed ca. 1.5 mm diam., ovoid, brown, shining. Bracts, bracteoles, and sepals falling entire with the fruit.

Specimens examined. NIGERIA. CROSS RIVER: Obura, Lyanmette, *Ekwuno et al.* (FHI 95876); Oban Forest Reserve, *J. A. Emwiogbon & Osanyinlusi* (FHI 87329). ONDO: Ondo–Ore rd., secondary forest, *J. Olorunfemi & Oguntayo* (FHI 86736). OYO: Univ. of Ife campus, *D. P. M. Guile 201* (IFE).

Widespread in tropical Africa. Common in shade at the edges of forest in Nigeria, often forming pure stands. The leaves are often reddish. Flowering September–November. Hausa: *Dankadafi.*

2. **Cyathula pedicellata** C. B. Clarke, Fl. Trop. Africa. 6(1): 46. 1909. *C. prostrata* f. *pedicellata* (C. B. Clark) Hauman in Fl. Congo Belge et Ruanda-Urundi 2: 64. 1951. *C. prostrata* (L.) Blume var. *pedicellata* (C. B. Clark) Cavaco, Fl. Cameroun 17: 46. 1974. TYPE: Uganda. Mengo District: Entebbe, *E. Brown 8* (holotype, K). Figure 5D1–D2.

Annual herb. Stems and branches prostrate to ascending, slender, rooting at the nodes. Stems and branches glabrous or pubescent. Leaves opposite, 30–50 × 20–30 mm, ovate to ovate-elliptic, apex acute, base rounded; petiole ca. 10 mm long. Leaves pubescent on the margins, upper surface and nerves, glabrous below. Inflorescence terminal, of elongated spikes, with cymules arranged laxly on the flowering axis. Fertile and sterile flowers present in the same cymule. Bracts and bracteoles similar to those of *Cyathula prostrata.* Lateral modified flowers with many hooked spines. Sepals ca. 2.5 mm long, elliptic-oblong, mucronate, white-ciliate. Capsule and seed similar to those of *Cyathula prostrata.*

Additional specimens examined. NIGERIA. BENDEL: Okomu Udo Forest Reservation, *T. K. Odewo & J. Olorunfemi* (FHI 101573). OGUN: Eggua Forest Reserve, *S. T. Oguntayo & Adejimi* (FHI 83476). ONDO: Erin-ode water falls, *J. Medler 266* (IFE). OYO: Erin Ijesha water falls, shady moist area in rain forest, *J. B. Faremi 1841* (IFE).

A forest species, found in shady and moist locations in southern Nigeria. The leaves and stems are often tinged purple. Also found in the forested areas in central and eastern Africa.

Cyathula pedicellata resembles *C. prostrata* in some respects but can be distinguished by having slender prostrate stems and lax inflorescence. Flowering March–June.

3. **Cyathula achyranthoides** (Kunth) Moq. in DC., Prodr. 13(2): 326. 1849. *Desmochaeta achyranthoides* Kunth in HBK, Nov. Gen. et Sp. 2: 210. 1817. TYPE: Colombia: Mompox, *Humboldt & Bonpland* (isotype, P not seen).

Achyranthes geminata Thonn. in Schum. & Thonn., Beskr. Guin. Pl. 138. 1827. *Cyathula geminata* (Thonn.) Moq. in DC., Prodr. 13(2): 326. 1849. TYPE: Ghana, *Thonning 216* (not located).

Perennial herb. Stems erect, robust, up to 40 cm tall, branching profusely. Stems and branches glabrous or pubescent. Leaves opposite, 30–120 × 18–63 mm, broadly elliptic, apex acute, base tapering into a short petiole, pilose (especially on the margins and nerves) or glabrous. Fertile and sterile flowers in cymules, in axillary and terminal, long or short spikes. Bracts foliaceous, acute. Bracteoles deltoid, pilose. Cymules with only 1 fertile flower. Modified flowers with a few hooked spines. Sepals 3.5–4 mm long, oblong-lanceolate, mucronate, white-pilose; petals absent; filaments slender, alternating with the staminodes; ovary ovoid. Seed 1.75 mm diam., rounded, black, shining.

Specimens examined. NIGERIA. ANAMBRA: Ishielu, Effium Forest Reserve, high forest, *Okafor & J. A. Emwiogbon* (FHI 66069). BAUCHI: ca. 15 mi. E of Aliyo village, *M. G. Latilo* (FHI 64739). GONGOLA: Baissa Forest Reserve, *Ekwuno & Osanyinusi* (FHI 93184). KWARA: Borgu Game Reserve, *G. S. Child 663* (FHI 30125). OYO: Ibadan, Univ. of Ife campus, *D. P. M. Guile 192* (IFE).

Occurs in the forested areas in western and eastern Africa. Present in moist and swampy places in southern Nigeria. Flowering November–February.

4. **Cyathula uncinulata** (Schrader) Schinz in de Wild., Pl. Bequaert. 5: 386. 1932. *Achyranthes uncinulata* Schrader, Ind. Sem. Hort. Goett. 1. 1833. TYPE: cultivated material from Göttingen Botanic Garden (holotype, LE photo seen). Figure 5E1–E2.

Cyathula globulifera Moq. in DC., Prodr. 13(2): 329. 1849. TYPE: Madagascar: *Bojer* (lectotype, G-DC. not seen).

Robust perennial herb. Stems erect or climbing, 60–100 cm (or up to 8 m tall when climbing), woody, pilose. Leaves opposite, 63–75 × 35–42 mm, broadly ovate, apex acute, base rounded, pilose (indumentum rusty brown in herbarium specimens); petiole 10–15 mm long, densely pilose. Flowers in terminal and axillary globose spinous heads, 20–25 mm diam., straw-colored. Bracts lanceolate. Pedicel pilose. Sepals unequal, the outer two 5.5–6 mm long, lanceolate, with a long acuminate apex ending in a curved hook, inner 3 sepals, ca. 4 mm long, lanceolate, sharply acute, membranous, glabrous; petals absent; filaments slender; ovary oblong-ovoid; style shorter than the sepals. Modified flowers provided with many hooked spines.

Specimen examined. NIGERIA. GONGOLA: Mambilla Plateau, *Ekwuno, Osanyinlusi & Okoro* (FHI 92718).

Found in forests and grasslands, up to 1,000 m. Widespread in Africa.

A robust herb, distinct in its straw-colored, spiny, globose flowering heads. The above-cited specimen is a new record for Nigeria. It was collected on the Mambilla Plateau at ca. 1,500 m in SE Nigeria. Flowering February.

7. PUPALIA A. L. Juss.

A small genus of 10 species, distributed in tropical Africa, Madagascar, and India. Represented in Nigeria by a single species.

1. **Pupalia lappacea** (L.) A. L. Juss., Ann. Mus. Nat. Hist. Paris 2: 132. 1803. *Achyranthes lappacea* L., Sp. Pl. 204. 1753. TYPE: Ceylon: *Linnean specimen 287/4* (holotype, LINN not seen). Figure 5F1–F3.

Annual herb. Stems 40–60 cm tall, erect, branched, often woody, strigose-pubescent. Leaves opposite, densely pubescent, 30–45 × 16–20 mm, ovate to ovate-lanceolate or ovate-elliptic, apex acute to acuminate, base tapering into a short petiole. Inflorescence of terminal spikes, these consisting of 3 lateral bisexual flowers with each of the outer 2 subtended by 2 modified flowers. Bracts ca. 4 mm long, ovate, scarious, with an excurrent midrib, pilose, persistent. Bracteoles of the modified flowers 3–5 mm long, subcordate to ovate, membranous, pilose; bracteoles of the sterile flowers ovate-lanceolate, pilose. Spines 3–7 mm long, yellowish, villous below. Sepals 5, 4–5 mm long, lanceolate to oblong-ovate, mucronate, densely pilose, 3-nerved; the inner 3 sepals shorter; petals absent; stamens 5, the filaments fused at the base, forming a fleshy cuplike structure; stigma capitate. Capsule 2–3 mm diam., rupturing irregularly. Seed solitary, 2–2.5 mm diam., dark brown or black, subglobose, beaked. Three-flowered clusters falling entire as burr.

Specimens examined. NIGERIA. BAUCHI: Wikki camp, *A. O. Ohaeri A00/002* (ABU); Yankari, *Ekwuno* (FHI 7522). KANO: Kano, Bayero Univ. campus, common in waste places, *S. A. Ghazanfar 373* (BUK). KADUNA:

Katsina, 5–6 mi. on road to Jibiya, common, *J. Medler 525* (IFE); Dumbi village, Zaria, *A. O. Ohaeri 1779* (ABU). KWARA: New Bussa rd., *T. K. Odewo & A. Binuyo* (FHI 96172). NIGER: Zuguruma, *Oyayomi & Fagbemi* (FHI 92128). OGUN: Orile-Ibara, fringe forest, *Magbagbeola* (FHI 94591). OYO: near Ife-Odan, woodland, *I. B. Faremi 1508* (IFE); Ibadan, *D. P. M. Guile 3323* (IFE).

Widespread in the tropics and subtropics of the Old World. A common weed of open and waste places, found throughout Nigeria. The burr sticks to the legs of animals and to clothing thus helping in the dispersal of seeds. Flowering October–May.

8. SERICOSTACHYS Gilg & Lopr.

A monotypic genus distributed in tropical Africa.

Sericostachys scandens Gilg & Lopr., Engl., Bot. Jahrb. 27: 151. 1899. TYPE: Cameroon: Yaounde, *Zenker 1420* (isolectotype, K). Figure 5G1–G3.

Liana or climbing herb. Stems woody, sparsely pubescent or glabrous. Leaves opposite, 60–100 × 30–60 mm, elliptic or obovate, glabrous or pubescent, apex acuminate, base cuneate, petiolate. Inflorescence a panicle of spikes 4–9 cm long, with fertile and sterile flowers in bracteate cymules, white-tomentose. Cymules with 1 fertile and 2–3 sterile flowers. Sepals 5, 4–5 mm long, lanceolate, acute; petals absent; stamens as long as the sepals; anther 2-celled; style long; stigma obscurely lobed; sterile flowers developing soft white filaments ca. 2 cm long when in fruit. Capsule ca. 3 mm diam., ovoid-cylindrical. Seed solitary, ovoid, brown, smooth.

Additional specimens examined. NIGERIA. ONDO: 1 mi. S of Itaje-Ekiti, *J. Lowe 2832* (K, FHI, UCI, IFE).

Distributed in forests of eastern and western Africa. Distinct in fruit, with its fluffy white inflorescences appearing as bottle brushes. Flowering January.

9. PANDIAKA (Moq.) Hook. f.

A genus of 20 species distributed in tropical and southern Africa. Represented in Nigeria by two species.

KEY TO THE SPECIES OF *PANDIAKA* IN NIGERIA

1a. Flowers in compact rounded cymose heads; bracts subtending the inflorescence ca. 10 mm long; sepals 8–9 mm long, lanceolate, white-pilose ..... 1. *P. involucrata*

1b. Flowers in cymose heads, globose at first, later elongating; bracts subtending the inflorescence up to 50 mm long; sepals 6–7 mm long, narrow-lanceolate, tomentose ..... 2. *P. angustifolia*

1. **Pandiaka involucrata** (Moq.) Benth. & Hook. f., Gen. Pl. 3: 35. 1880. *Achyranthes involucrata* Moq. in DC., Prodr. 13(2): 310. 1849. TYPE: N Nigeria, Pandiaki, 17 Sep. 1941, *Ansell s.n.* (holotype, K). Figure 5H1–H2.

Pandiaka involucrata (Moq.) Benth. & Hook. f. var. *megastachya* Suesseng., F.R. 44: 46. 1938. TYPE: N Nigeria, Naraguta, *Lely s.n.* (holotype, K).

Robust, erect woody herb or undershrub. Stems and branches hirsute. Leaves opposite, sessile, 4–70 × 6–22 mm, oblong-lanceolate, apex acute to acuminate, densely pubescent at the base and margins, sparsely on the surfaces. Inflorescence of terminal and axillary cymes. Peduncles long, opposite, and paired, pilose. Cymes compact, rounded, white, terminal on the lateral branches. Flowers very dense, sessile to subsessile. Bracts subtending the inflorescence foliaceous, ca. 10 mm long, ovate, pilose. Bracteoles scarious, pilose at the base and midrib. Flowers bisexual; sepals 5, 8–9 mm long, lanceolate, acute, white-pilose; petals absent; stamens 5, filaments about as long as the sepals, slender, basally connate; staminodes present, alternating with the stamens; ovary oblong; style long. Capsule subglobose.

Additional specimens examined. NIGERIA. BAUCHI: Yankari game reserve, *C. Geerling 2976* (FHI 38217). CROSS RIVER: Ogoja, Yabe-Okuku rd., *J. A. Emwiogbon & Osanyinlusi* (FHI 87055). KWARA: Ilorin, Ajeigbe camp, *J. Olorunfemi, S. T. Oguntayo & Ihe* (FHI 88594). OGUN: Abeokuta, Olokemeji Forest Reserve, *T. L. Odewo* (FHI 92066). OYO: Erin-Odo, *Akabogu 32* (IFE); Okeho Baptist Secondary School, *Z. Gbile & J. Olorunfemi* (FHI 20451; IFE). PLATEAU: Jos, *J. Olorunfemi* (FHI 55014).

Common in the savanna regions of W Africa. Found in dry, rocky locations in, mostly northern, Nigeria. Uncommon in East Africa. Flowering October–December. Hausa: *Maasun kadagaree.*

2. **Pandiaka angustifolia** (M. Vahl) Hepper, Kew Bull. 25: 189. 1971. *Gomphrena angustifolia* M. Vahl, Symb. Bot. 3: 45. 1794. TYPE: Ghana: labeled as "*dedit Thonning*" (holotype, S not seen). Figure 5I1–I4.

Achyranthes heudelotii Moq. in DC., Prodr. 13(2): 310. 1849. *Pandiaka heudelotii* (Moq.) Hiern., Cat. Aft. Pl. Welw. 1: 894. 1900. TYPE: Senegal: Bakel, *Heudelot 280* (holotype, P not seen).

A. angustifolia Benth. in Hook., Nig. Pl. 429. 1849. TYPE: Nigeria: R. Niger, Quorra, *Vogel 98* (holotype, K not seen).

P. heudelotii var. *spicata* Suesseng. in B.J.B.B. 15: 65. 1938. TYPE: Ghana: *Irvine* (lectotype, K not seen).

P. heudelotii var. *subglobosa* Suesseng. in B.J.B.B. 15: 66. 1938. TYPE: Nigeria: *Lely P641* (holotype, K not seen).

Annual herb or subshrub. Stems 20–50 cm tall, erect, with diffuse branching, often woody at the base, sulcate, pubescent, densely so on the ribs. Leaves opposite, pubescent, 20–60 × 4–8 mm, narrowly oblong to oblong, apex acute. Bracts subtending the inflorescence similar to the leaves, up to 50 mm long. Spike at first globose, later elongating. Bracts 5.5–6 mm long, scarious, ovate, with a long mucronate apex. Bracteoles subequaling the bracts, navicular, pilose on the midrib. Sepals 5, closely cohering apically, 6–7 mm long, narrow-lanceolate, acuminate; the outer 3 sepals longer, tomentose; sepals and midrib of the bracteoles often tinged reddish pink; petals absent; stamens 5; staminodes hyaline, apically bilobed, alternating with the stamens; style slender. Capsule subglobose. Seed solitary, discoid.

Specimens examined. NIGERIA. KADUNA: Samaru, univ. farm, *B. J. Harris 6844* (ABU); Birnin Gwari, Dogon Daura Forest Reserve, *Soladoye, Ekwuno & Ihe* (FHI 83378). KANO: Bayero Univ. campus, *S. A. Ghazanfar s.n.* (BUK). KWARA: Ilorin, Shaguna Research Station, *J. B. Hall 747* (IFE); Borgu Game Reserve, *Child 553* (FHI 29853). OYO: Olokemeji Forest Reserve, *I. B. Faremi 1018* (IFE). PLATEAU: Jos, *Schodennde* (FHI 40741).

Distributed in west tropical Africa; also found in East Africa. A common weed in dry arid locations in Nigeria. Flowering September–November. Hausa: *Maasum kadagaree.*

10. ACHYRANTHES L.

A small genus of six species distributed in the warm temperate and tropical regions. Represented in Nigeria by three species.

KEY TO THE SPECIES OF *ACHYRANTHES* IN NIGERIA

1a. Leaves lanceolate to linear-lanceolate. Perennials ..... 1. *A. talbotii*

1b. Leaves broadly ovate to elliptic or oblong-elliptic. Annuals or perennials.

2a. Leaves broadly ovate, up to 17 × 12 cm; bracts about as long as the sepals ..... 2. *A. bidentata*

2b. Leaves elliptic to oblong-elliptic, up to 10 × 5 cm; bracts shorter than the sepals ..... 3. *A. aspera*

1. **Achyranthes talbotii** var. **talbotii** Hutch. & Dalz., Kew Bull. 29. 1928. TYPE: Nigeria, *Talbot s.n.* (holotype, K).

Perennial herb. Stems woody, up to 40 cm tall, sparsely pubescent. Leaves 30–75 × 5–12 mm, lanceolate to linear-lanceolate, sparsely pubescent. Flowers in elongated, slender spikes up to 15 cm long. Flowers greenish; sepals ca. 4 mm long; stamens crimson. In fruit, flowers separated from each other toward the base of the flowering shoot.

Achyranthes talbotii var. *talbotii* is reported from Oban (southern Nigeria), *Talbot s.n.*, by Hutchinson & Dalziel (1954). I have seen no material at FHI or IFE. The record needs confirmation.

Achyranthes talbotii var. **ogojensis** Suesseng., Mitt. Bot. Staatssamml. Muench. 4: 102. 1952. TYPE: Nigeria: Ogoja, Ikom, 12 Dec. 1950, *R. W. J. Keay* (holotype, FHI 28264).

Leaves 25–40 × 10–25 mm, lanceolate, apex obtuse.

A very poor specimen. *Achyranthes talbotii* var. *ogojensis* is known only from the type gathering. It differs from the type variety in its narrower leaves. More material is required to confirm its status. Flowering December.

2. **Achyranthes bidentata** Blume, Bijdr. Dierkd. 544. 1826. TYPE: Java: Mt. Burangrong, *Blume 897.294-84* (lectotype, L not seen). Figure 6A1–A3.

Annual or perennial herb. Stems 60–100 cm tall, ascending to erect. Stems and branches pubescent. Leaves opposite, petiolate, up to 17 × 12 cm, broadly ovate, apex acuminate, base tapering into the petiole; lower surface and nerves pubescent. Flowers in narrow spikes, these terminal and axillary, at first dense, later elongating and becoming lax. Bracts 3–5 mm long, glabrous, narrowly lanceolate, membranous. Bracteoles 3–5 mm long, with the basal appendages inserted on the base of the midrib. Flowers bisexual; sepals 5, 4–6.5 mm long, the outermost longest, all narrow-lanceolate, 3-nerved, the central nerve distinct, all sepals with a pale margin; petals absent; stamens 5, the filaments about half the length of the sepals; staminodes obscurely dentate at the apex, alternating with the stamens; style slender. Capsule 2–3 mm diam. Seed solitary, cylindrical, smooth.

Specimens examined. NIGERIA. ONDO: Ikere, open forest, *J. Olorunfemi & Fagbemi* (FHI 70744); Akure, Adanre, *Brenan & Jones 8726* (FHI) (as f. *nigrecans*). OYO: Owo Ago-Daudu, high forest, *J. Olorunfemi & A. Binuyo* (FHI 96844).

Found in shady and moist locations, and in forested areas in southern Nigeria. Flowering November–January.

3. **Achyranthes aspera** L., Sp. Pl. 204. 1753. TYPE: Ceylon: Herb. Hermann, Volume 2, p.

FIGURE 6. A. *Achyranthes bidentata.*—A1. Part of inflorescence.—A2. Flower.—A3. Flower with sepals removed. B. *A. aspera.*—B1. Habit.—B2. Flower.—B3. Bract.—B4. Sepal.—B5. Stamens and staminodes.—B6. Gynoecium.—B7. Stamen. C. *Centrostachys aquatica.*—C1. Habit.—C2. Flower.—C3. Flower with sepals removed. D. *Blutaparon vermiculare.*—D1. Habit.—D2. Flower with front sepals removed. E. *Gomphrena celosioides.*—E1. Habit.—E2. Flower with bracts.—E3. Flower.—E4. Outer sepal.—E5. Flower with front sepals removed showing

69, right-hand specimen (lectotype, BM not seen). Figure 6B1–B7.

Annual or perennial herb. Stems 30–60 cm tall, erect or somewhat prostrate, often woody at the base, pubescent. Leaves opposite, 20–100 × 15–50 mm, petiolate, elliptic to oblong-elliptic, apex acute or obtuse, base cuneate, adpressed-pubescent on the surfaces and nerves. Flowers in terminal and axillary spikes, these at first dense, elongating when in fruit. Flowers reflexed in fruit. Bracts 2–4 mm long, lanceolate, membranous, glabrous. Bracteoles ca. 3 mm long, spinous, membranous. Basal appendages about ⅓ the length of the spine and adnate to it. Flowers bisexual, glabrous; sepals 5, 3.5–6 mm long, lanceolate, the outermost longest, apex indurate, 3-nerved, with the central nerve most distinct, all sepals with a pale margin; petals absent; stamens 5, the filaments alternating with the staminodes; style slender. Capsule 1–3 mm diam. Seed solitary, cylindrical, smooth.

Specimens examined. NIGERIA. KANO: Kano, Bayero Univ. campus, *B. Sharland s.n.* (BUK). KWARA: New Bussa, wildlife school site, No. KZOG271 (FHI 91592). GONGOLA: Jalingo, *P. Wit & B. O. Daramola* (FHI 78131); Mambilla Plateau, *Chapman 2992* (FHI 81192). IMO: Umuahia, Ikwano, *Ariwaodo* (FHI 99503). OYO: Ibadan, by roadside, *D. P. M. Guile 60* (IFE).

Found throughout the warmer parts of the world. Frequently a weed of cultivated fields, waste places, roadsides, dry shrub, and rocky sites.

Achyranthes aspera is variable in its indumentum characters and in the size and shape of leaves and flowers. It resembles *A. bidentata* but differs by having smaller leaves and an erect habit. Further, *A. bidentata* does not occur in northern Nigeria. Flowering September–March. Hausa: *Hakorin maciji.*

11. CENTROSTACHYS Wallich

A monotypic genus distributed in tropical Asia and Africa.

Centrostachys aquatica (R. Br.) Wallich ex Moq. in DC., Prodr. 13(2): 321. 1849. *Achyranthes aquatica* R. Br., Prodr. Fl. Nov. Holl. 417. 1810. TYPE: Thailand: Bangkok, *Koenig s.n.* (holotype, BM not seen). Figure 6C1–C3.

Perennial, aquatic or subaquatic herb. Stems thick, striate. Leaves opposite up to 15 × 5 cm, lanceolate-elliptic, apex acute, base cuneate; petiole 4–6 cm long. Upper portion of the stem, petiole, and nerves pubescent. Young leaves villous. Flowers in long, terminal spikes. Bracts ca. 2 mm long, deltoid, membranous, persistent. Bracteoles orbicular, membranous, persistent. Flowers bisexual; sepals 5, green, glabrous, 6.5–8 mm long, lanceolate, acute, 3-nerved, the outermost longest; petals absent; staminodes yellow, divided at the apex; stamens 5, the filaments flattened, alternating with the staminodes; anther 2-celled. Fruit a nutlet, falling entire with the sepals and bracteoles. Seed solitary.

Specimens examined. NIGERIA. BENDEL: Benin, Siluko River, rooting in mud, *C. F. A. Onochie* (FHI 34673); Okumu Forest Reserve, River Osse, *J. Lowe 1239* (IFE). SOKOTO: Talata Mafara village, in stagnant pool, *M. G. Latilo* (FHI 62810).

Widespread in tropical Africa. Found in shallow permanent water bodies or marshy areas floating or anchored with stems rooting at the nodes. Flowering August, February.

12. BLUTAPARON Mears

A genus of 10 species distributed in coastal tropical Australia, warm regions of America, the West Indies, and West Africa. Represented in Nigeria by a single species.

1. **Blutaparon vermiculare** (L.) Mears, Taxon 31: 113. 1982. *Illecebrum vermiculare* (L.) L., Sp. Pl., 2nd. edition 1: 300. 1762 ("vermiculatum"). *Philoxerus vermicularis* (L.) J. E. Smith in Rees, Cycl. volume 27, *Ord. Alph.* 1814 ("vermiculatum"). *Gomphrena vermiculare* L. Sp. Pl. 224. 1753. TYPE: Brasiliam (?), *Hermannus s.n.* (lectotype, Sloan herb. 2: 108, BM). Figure 6D1–D2.

Decumbent herb. Stems succulent, rooting at the nodes. Leaves 20–50 × 4–6 mm, linear to oblanceolate, apex abruptly acute, base amplexicaul, glabrous. Axillary leaf fascicles present. Flowers congested in ovoid or cylindrical terminal spikes. Bracts ca. 3 mm long, ovate, 1-nerved, white. Flowers bisexual; sepals 5, silvery white, elliptic-

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staminal tube.—E6. Gynoecium. F. *Alternanthera maritima*, habit. G. *A. pungens.*—G1. Habit.—G2. Outer sepal.—G3. Inner sepal.—G4. Inner lateral sepal.—G5. Seed. H. *A. sessilis.*—H1. Habit.—H2. Flower.—H3. Mature flower with fruit. Scale bars B1, C1, D1, E1, F, G1, H1 = 20 mm; A1 = 10 mm; E2–5 = 3 mm; A2–3, B2–7, C2–3, D2, E6, G2–5, H2–3 = 2 mm.

lanceolate, 1-nerved; petals absent; stamens 5, the filaments ca. ½ the length of the sepals, basally connate; anthers 1-celled; staminodes absent; style short; stigmas 2. Fruit an achene.

Additional specimens examined. NIGERIA. LAGOS: Lagos, Ikorodu, by edge of lagoon, *B. O. Daramola* (FHI 86137); Lagos, Bar beach, *Okafor & Macauley* (FHI 58595).

A coastal species found in southern Nigeria forming sand-binding mats. Flowering April, June.

13. GOMPHRENA L.

A large genus of 100 species mainly distributed in tropical Central and South America, and represented by several species in Australia. Represented in Nigeria by two species.

KEY TO THE SPECIES OF *GOMPHRENA* IN NIGERIA

1a. Spikes at first globose, later elongating; bracts and flowers whitish, scarious. Wild species ..... 1. *G. celosioides*

1b. Spikes subglobose; bracts and flowers pink to purple. Often cultivated and found as an escape ..... 2. *G. globosa*

1. **Gomphrena celosioides** Martius, Nova Acta Phys.-Med. Acad. Caes. Leop. Nat. Cur. 13: 301. 1826. TYPE: Brazil: *Sellow* (isotype, K). Figure 6E1–E6.

Perennial or annual herb. Stems 15–50 cm tall, decumbent or erect, branching from the base, with dense, white, woolly, appressed hairs, becoming glabrescent with age. Leaves opposite, gray-green, 15–40 × 3–13 mm, lanceolate to elliptic-oblong, appressed-woolly on the under surface, apex acute to mucronate, base tapering into a short petiole; leaves subtending the inflorescence sessile, oblong to narrow oblong. Flowers solitary in the axil of bracts. Inflorescence first globose, later elongating, becoming cylindrical, the axis lanate. Bracts 2.5–3.5 mm long, ovate-deltoid, scarious, with an excurrent midrib; bracteoles 5–6 mm long, navicular, mucronate, hyaline, the upper ⅓ of the midrib dorsally winged. Flowers bisexual; sepals 5, 4–5 mm long, narrowly lanceolate, mucronate, with long woolly hairs at the base; inner 2 segments with a prominent green midrib; petals absent; stamens 5, monadelphous, the tube with 5 deeply bilobed teeth at the apex; lobes obtuse with the anthers present in between; anthers 1-celled; staminodes absent; stigmas 2, divergent. Capsule ca. 2 mm diam., somewhat compressed, rupturing irregularly. Seed solitary, ca. 1.5 mm diam., compressed, ovoid, dark brown, shining, faintly reticulate.

Additional specimens examined. NIGERIA. BAUCHI: Yankari Game Reserve, *Ekwuno* (FHI 87429). KANO: Bayero Univ. residential area, by roadside, common weed, *S. A. Ghazanfar 468* (BUK). LAGOS: Epe, mangrove, *Magbagbeola & Fagbemi* (FHI 94875). OYO: Igbetti–Ilorin rd., savanna grassland, *Ibhanesebhor & Adejimi* (FHI 9732); Ibadan, Ife Univ. campus, *D. P. M. Guile 203* (IFE). PLATEAU: Abuja–Keffi rd., *J. Olorunfemi* (FHI 54984).

A common, rapidly spreading weed of savanna areas, found in open places, by roadsides, and in gardens, mostly in the drier localities of Nigeria. Overlooked previously. Mentioned by Hutchinson & Dalziel (1954) as occurring in eastern Africa as far west as Katanga. A native of South America, probably introduced in East Africa, now naturalized in East and West Africa. Flowering October–November; June–August.

2. **Gomphrena globosa** L., Sp. Pl., 1st edition. 224. 1753. TYPE: *Linnean specimen 319/1* (holotype, LINN not seen).

Annual herb, up to 50 cm tall. Stems erect to decumbent, pubescent with dense, white, appressed hairs, becoming glabrescent with age. Leaves opposite, 40–60 × 18–35 mm, obovate to oblanceolate, apex acute, base tapering into a short petiole, pilose. Flowers in subglobose spikes, subtended by 2–3 leaves. Bracts deltoid-ovate, 3–5 mm long, mucronate. Bracts and flowers pink to purple, persistent. Flowers bisexual; sepals 5, similar to those of *C. celosioides*; petals absent; stamens 5, the filaments united into a tube, deeply bilobed at the apex; stigmas 2, divergent. Capsule oblong-ovoid, ca. 2 mm diam., compressed. Seed ovoid, compressed, brown, smooth, shining.

Specimen examined. NIGERIA. KANO: Kano, Bayero Univ. residential area, *S. A. Ghazanfar s.n.* (BUK).

The species is native of South America and is often cultivated in Nigeria ornamentally. Often found as an escape. Flowering June–July. Hausa: *Kandirii.*

14. ALTERNANTHERA Forsskal

A genus with 170 species, tropical and subtropical in distribution, chiefly in the American tropics. Several species are widely distributed weeds. Represented in Nigeria by four species.

KEY TO THE SPECIES OF *ALTERNANTHERA* IN NIGERIA

1a. Sepals unequal; outer sepals longer, 3–5-nerved.
2a. Maritime plant; stems creeping; leaves ob-

ovate to oblanceolate, apex obtuse. Outer sepals 3-nerved ..... 1. *A. maritima*

2b. Inland plant; stems erect, decumbent or ascending; leaves rhomboid-ovate, apex acute to shortly acuminate. Outer sepals 5-nerved at the base ..... 2. *A. pungens*

1b. Sepals equal; outer sepals 1-nerved.

3a. Sepals 3.5–4 mm long, pubescent on the midrib; stems villous ..... 3. *A. nodiflora*

3b. Sepals 2–2.5 mm long, glabrous on the midrib; stems and branches pubescent on one side only ..... 4. *A. sessilis*

1. **Alternanthera maritima** (Martius) St. Hil., Voy. Litt. Bresil. 2: 437. 1833. *Telanthera maritima* (Martius) Moq. in DC., Prodr. 13(2): 364. 1849. *Bucholzia maritima* Martius, Nov. Gen. et Sp. 2: 50. t. 147. 1826. TYPE: Brésil, *Martius s.n.* (holotype, M not seen). Figure 6F.

Prostrate herb. Stems creeping, up to 5 m long, rooting at the nodes. Leaves opposite, glabrous, 25–35 × 9–15 mm, obovate to oblanceolate, apex obtuse, base cuneate, tapering into a short petiole. Flowers in compact spikes, these ovoid, ca. 1.5 cm diam., axillary. Bracts ca. 4 mm long, ovate-lanceolate, acute. Bracteoles 2. Flowers bisexual, white, scarious; sepals 5, unequal, 4.5–5.5 mm long, the outer sepals longer, ovate, acute, strongly 3-nerved, sparsely pilose at the base; petals absent; stamens 5, filaments connate at the base, included in the sepals; staminodes present, alternating with the stamens; anthers 1-celled. Capsule compressed, indehiscent, falling entire with the sepals. Seed solitary, rounded.

Creeping in sand along the coastal areas of Lagos and Cross Rivers estuary. I have seen no authentic specimens of the species at FHI. Flowering September–October.

2. **Alternanthera pungens** Kunth in HBK, Nov. Gen. Sp. 2: 206. 1818. TYPE: Colombia: Maypur Waterfall, Rio Orinoco, *Humboldt & Bonpland* (isotype, P not seen). Figure 6G1–G5.

Achyranthes repens L., Sp. Pl. 205. 1753. [*Alternanthera repens* (L.) Link, Enum. Pl. Hort. Berol. Alt. 1: 154. 1821, non Gmelin, Syst. Nat., 13th edition 2(8): 106. 1791.] TYPE: Eltham gardens, ex herb. Dillenus (lectotype, OXF not seen).

Prostrate herb, branching at the base from a woody stock. Stems erect, decumbent or ascending, rooting at the nodes, white villous. Leaves opposite, 15–22 × 11–16 mm, rhomboid-ovate, apex acute or shortly mucronate, base tapering into a short petiole; leaf base usually pilose, surfaces sparingly pilose or glabrous. Flowers in compact spikes, these globose, axillary, prickly, 2–4 together, less often solitary. Bracts 4–5 mm long, lanceolate, aristate, membranous, denticulate at the apex; bracteoles similar to the bracts, 3–4 mm long. Flowers bisexual, white, scarious; sepals unequal, 2–5 mm long, the outer 2 longest, ovate-lanceolate, rigid, 5-nerved below, with an excurrent pungent midrib, villous at the base; inner third sepal ca. 3 mm long, oblong, dentate at the apex, 3-nerved; the 2 lateral sepals, ca. 2 mm long, denticulate, mucronate at apex, with stiff hairs on the midrib; petals absent; stamens 5, alternating with broad staminodes, included in the sepals. Capsule rounded, somewhat compressed. Seed solitary, ca. 1.5 mm diam., discoid, brown, shining.

Specimens examined. NIGERIA. BAUCHI: Takuma, *Ekwuno* (FHI 63775). BENUE: Okura-Olafia, *B. O. Daromola, J. A. Emwiogbon & S. T. Oguntayo* (FHI 92311). OGUN: Ogun-Ijebu-Ode, high forest, *T. K. Odewo & Adedeji* (FHI 99957). OYO: Ife Univ. campus, base of hill, *I. B. Faremi s.n.* (IFE).

Native of tropical America, introduced and now a widespread weed in the tropics and subtropics around the world. A common, creeping, weed of open waste lands throughout Nigeria. Flowering December.

3. **Alternanthera nodiflora** R. Br., Prodr. Fl. Nov. Holl. 416. 1810. TYPE: Australia: *Robert Brown 3066* (lectotype, K).

Annual or perennial decumbent herb. Branches arising from a woody stock, often rooting at the nodes, villous. Leaves opposite, 15–35 × 4–5 mm, linear-lanceolate to obovate, apex acute, base sessile, glabrous. Spikes globose, compact, axillary. Bracts and bracteoles 1–2 mm long, ovate-lanceolate, acute. Flowers white, scarious, prickly; sepals equal, 3.5–4 mm long, ovate-lanceolate, sharply acute, 1-nerved, pubescent on the midrib; obscurely denticulate on the margins; petals absent; stamens 5, about ⅓ the length of the sepals, alternating with the staminodes; style very short. Seed ca. 1.7 mm diam., discoid, brown.

Additional specimens examined. NIGERIA. KADUNA: Samaru, *D. Philcox 241* (FHI); Birnin Gwari, Mando Forest Reserve, *Soladaye, Ekwuno & Ihe* (FHI 83949).

Found throughout Australia and tropical and southern Africa. Common in the drier areas of Nigeria, in moist waste places by pools and in irrigated areas. Flowering October. Hausa: *Buuzun-marayaa.*

4. **Alternanthera sessilis** (L.) DC., Cat. Hort. Monsp. 77. 1813. *Gomphrena sessilis* L., Sp. Pl. 225. 1753. TYPE: Sri Lanka (Ceylon): Hermann Herbarium Volume 2, page 78 (lectotype, BM not seen). Figure 6H1–H3.

Alternanthera triandra Lam., Encycl. 1: 95. 1783.
Alternanthera repens Gmelin, Syst. Nat., 13th edition, 12(1): 106. 1791. TYPE: Forsskal Cent. 1, 100 (holotype, C not seen).

Annual or perennial herb. Stems up to 30 cm tall, branched, erect to ascending or (in wet places) prostrate, rooting at the nodes; one side of stem and branches, and axils of leaves pubescent. Leaves glabrous or sparsely pilose, up to 80 × 20 mm, obovate or spathulate to oblanceolate or oblong, apex obtuse to sharply acuminate, base cuneate, tapering into a short petiole. Inflorescence of sessile, axillary spikes. Bracts and bracteoles 1–1.5 mm long, ovate-lanceolate, scarious, mucronate, persistent. Flowers bisexual, white, scarious; sepals 5, 2–2.5 mm long, white, elliptic, acuminate or rounded with a mucronate tip, 1-nerved; petals absent; stamens 5, shorter than the sepals, alternating with the staminodes; ovary compressed; style very short. Seed ca. 1 mm diam., discoid, brown, shining, faintly reticulate on the surfaces.

Specimens examined. NIGERIA. KADUNA: Samaru village, creeping, flowers white, *A. O. Ohaeri s.n.* (ABU). KANO: Rimin Gado, common, *S. A. Ghazanfar 413* (BUK). KWARA: near Jebba, marshy open area, *I. B. Faremi 880* (IFE). OYO: Ibadan, *D. P. M. Guile 169* (IFE); Ife Univ., *Sijuade s.n.* (IFE). PLATEAU: Dutsin Pedong, *J. B. Hall 2167* (IFE). SOKOTO: near Bin Yauri, common, *J. B. Hall 2539* (IFE).

A common species, widespread in the tropics and subtropics of the Old World and New World. Common throughout Nigeria, occurring as a weed in ditches, by roadsides, and in moist and wet locations. A species of variable habitats and with variable vegetative characters. Flowering May–September. Hausa: *Main-kain-dubu.*

CULTIVATED SPECIES OF *ALTERNANTHERA* IN NIGERIA

1. **Alternanthera tenella** Colla, Mem. R. Acad. Sci. var. **bettzickiana** (Regel) Veldk., Taxon 27: 313. 1978.

Bushy perennial with erect or ascending stems. Leaves often purplish, elliptic to oblanceolate, apex acute, base long-attenuate. Flower clusters axillary, globose, white. Sepals unequal, the outer 3 longer.

Probably a native of Brazil, unknown in the wild. Commonly cultivated as a border plant. The leaves and stems are reddish purple.

PORTULACACEAE

A family with 19 genera and 580 species, almost cosmopolitan in distribution, and concentrated in South Africa. Represented in Nigeria by two genera.

KEY TO THE GENERA OF PORTULACACEAE IN NIGERIA

1a. Flowers solitary or fascicled; ovary semi-inferior; capsule circumscissile ..... 1. *Portulaca*
1b. Flowers in racemes or panicles; ovary superior; capsule dehiscing by valves ..... 2. *Talinum*

1. PORTULACA L.

A large genus with 200 species distributed in the tropical and subtropical regions, especially in America. Poorly represented in Nigeria with four species.

KEY TO THE SPECIES OF *PORTULACA* IN NIGERIA

1a. Leaves opposite; petals 4; flowers 1(–4), terminal ..... 1. *P. quadrifida*
1b. Leaves alternate or subopposite; petals 5 or more; flowers in clusters.
  2a. Stipular hairs minute or obsolete; leaves flat, spathulate-oblanceolate; sepals keeled ..... 2. *P. oleracea*
  2b. Stipular hairs threadlike; leaves terete or subterete, linear to linear-oblong; sepals not keeled.
    3a. Leaves usually crowded at the ends of branches; flowers small; petals 7–8 mm long ..... 3. *P. foliosa*
    3b. Leaves throughout the length of the stems; flowers large and showy; petals 17–18 mm long ..... 4. *P. grandiflora*

1. **Portulaca quadrifida** L., Syst. Nat., 12th edition, 2: 328 et Mant. Pl. 73. 1767. TYPE: cultivated specimen, grown from seed sent from Egypt. Figure 1B.

[*Portulaca foliosa* sensu Baker f., J. Linn. Soc. Bot. 40: 25. 1911.]

Annual herb. Stems and branches glabrous, prostrate, up to 30 cm long, often rooting at the nodes. Leaves opposite, fleshy, 8–10 × 3–4 mm, lanceolate to elliptic-oblong, apex acute or obtuse; Petiole ca. 1 mm long. Stipular hairs copious, white silvery. Flowers 1–4, terminal, surrounded by 4 leaves and many long white hairs. "Sepals" (bracteoles) 2, 2–4 mm long, unequal, ovate, obtuse, united basally; "petals" (sepals) 4, yellow or orange, ovate, united at the base; stamens 8, adnate

to the sepals; carpels 4; ovary ovoid; stigmas 4, linear. Capsule ca. 3 mm diam., conical, dehiscence circumscissile. Seed ca. 1 mm long, reniform, gray-black, the testa verrucose with rounded tubercles.

Specimens examined. NIGERIA. BENDEL: Benin, Ugo town, *J. A. Emwiogbon* (FHI 60043). SOKOTO: Argungu, Begga Forest Reserve, herb with red flowers, *coll. ignot.* (FHI 93425).

Widespread in the tropics and subtropics as a weed of hot and dry areas. Found in the warmer parts of Nigeria in waste places and in fields. Flowering April, June.

2. **Portulaca oleracea** L., Sp. Pl. 1: 445. 1753. TYPE: described from Europe, India, Ascension Island, and America, *Linnean specimen 625/1* (holotype, LINN not seen). Figure 1A1–A6.

Annual glabrous herb with spreading, ascending to prostrate branches. Stems fleshy, 15–30 cm tall. Leaves alternate, 25–40 × 18–21 mm, obovate, glabrous, fleshy, apex retuse, base tapering into a short petiole. Stipular hairs usually absent. Flowers sessile in cymose clusters of 3–6, usually present in the forks of branches. Bracts ca. 3 mm long, membranous, ovate, acuminate. Flowers yellow; "sepals" (bracteoles) 3–4 mm long, ovate, with a membranous margin, keeled at the back, united basally. "Petals" (sepals) 5, ca. 6 mm long, basally united, shallowly bilobed at the apex, with a small mucro extending into the middle of the lobes on the dorsal side; stamens 7–12; filaments yellowish, smaller than the sepals and adnate to them below; ovary ovoid, enveloped in the persistent perianth; stigmas 4–5. Seeds ca. 0.5 mm long, reniform, black, testa verrucose.

Specimens examined. NIGERIA. CROSS RIVER: Obudu, Sonkwala, *Ekwuno et al.* (FHI 96004). KANO: Kazaure irrigation canal, in open savanna grassland, *I. B. Faremi s.n.* (IFE); Kano, Bayero Univ. campus, *S. A. Ghazanfar 342* (BUK). KWARA: Ilorin, Shagunu Research Station, shore of lake, *J. B. Hall 1295* (IFE). LAGOS: Ikeja, stream side, *T. K. Odewo & Adedeji* (FHI 99902). NIGER: Nupe, Charati railway station, *R. W. J. Keay* (FHI 20151). OGUN: Abeokuta, Ilaro rd., fringe forest, *Magbagbeola et al.* (FHI 94723). OYO: Ibadan, Ife Univ. campus, flowers yellow, withering rapidly, *D. P. M. Guile 136* (IFE).

Widespread in tropical Africa. A common weed in gardens and waste places growing in shady and moist locations throughout Nigeria. The flowers open during the morning and are usually closed in the afternoon. Flowering April–June; August–September. Hausa: *Babba jibji, Daaburin-saamiyaa.*

3. **Portulaca foliosa** Ker-Gawler, Bot. Reg. 10: t. 793. 1824. TYPE: Ghana. Collector and location of type not known. Figure 1C.

Annual or perennial herb, up to 35 cm tall, with stout, erect to ascending or prostrate branches. Leaves usually crowded at the ends of branches, alternate, sessile, 18–27 × 0.3–0.5 mm, linear, subterete, apex acute, glaucous. Stipular hairs present. Flowers terminal, (1)2–6, surrounded by subverticillate leaves and dense tufts of hairs. Bracts membranous, ovate, acuminate. "Sepals" (bracteoles) ca. 3 mm long, ovate, acuminate, pinkish; "petals" (sepals) 5, yellow or orange, 7–8 mm long, apex emarginate; stamens many; ovary ovoid; stigmas 4. Seed ca. 5 mm long, subreniform, black, testa with radiating rounded tubercles.

Specimens examined. NIGERIA. BAUCHI: Bauchi, Yankari, *Ekwuno 410* (FHI 87481). BORNO: Maiduguri, along Alo River, herb succulent, with yellow-reddish flowers, *B. O. Daramola & Josephine* (FHI 63669). KWARA: New Bussa, *Wildlife Officer* (FHI 91415). OYO: Oke-Iho, ca. 3 mi. E of town on Iseyin rd., filaments pink, *R. W. J. Keay* (FHI 37904).

Widespread in tropical Africa. Common in the drier areas in Nigeria. Flowering June–November.

4. **Portulaca grandiflora** Hook. f., Bot. Mag. t. 2885. 1829. TYPE: Argentina: between Río del Saladillo or western boundary of the Pampas, and the foot of the mountain near Mendoza, *Dr. Gillies s.n.* (holotype, K not seen).

Annual or perennial herb. Stems and branches diffuse, spreading, erect to prostrate, glabrous, succulent, rooting at the nodes. Nodes with long yellowish hairs. Leaves alternate, 7–30 × 2–3 mm, linear to linear-oblong or terete, glabrous. Stipular hairs few in the leaf axils. Flowers solitary or 3, sessile, subtended by 5–8 leaves and a dense tuft of hairs. Flowers white, yellow, or rose-red; "sepals" (bracteoles) 2–4 mm long, ovate, obtuse; "petals" (sepals) 5, or multiples of 5, ovate to obovate, emarginate at the apex; stamens many, united at the base; ovary ovoid; stigmas 5, linear, recurved. Seeds ca. 1 mm long, reniform, black, the testa with rounded tubercles.

Commonly cultivated for ornament and sometimes escape. (The species in the present account has been described from living material in cultivation at Bayero University Botanic Garden, Nigeria.) Flowering July.

2. TALINUM Adans.

A genus of 50 species distributed in the warmer parts of America (especially Mexico), Africa, and Asia. Represented in Nigeria by two species.

KEY TO THE SPECIES OF *TALINUM* IN NIGERIA

1a. Stems herbaceous, up to 4 cm long, with the upper portion angled; flowers purple, in usually branched lax racemes ..... 1. *T. triangulare*
1b. Stems woody, up to 70 cm long, not angled; flowers pink, in usually branched elongated racemes ..... 2. *T. portulacifolium*

1. **Talinum triangulare** (Jacq.) Willd., Sp. Pl. 2: 862. 1800. *Portulaca triangularis* Jacq., Enum. Pl. Carib. 22. 1760. TYPE: West Indies (collector & location unknown). Figure 1D.

Annual herb, usually unbranched, up to 40 cm tall. Taproot swollen. Stems fleshy, sometimes with a woody base. Upper part of the stem winged, appearing 3-angled. Leaves alternate, glabrous, somewhat fleshy, 50–80 × 15–31 mm, oblanceolate, apex obtuse, base tapering into a short petiole. Flowers in lax racemes. Flowers purple; "sepals" (bracteoles) 2, 4–4.5 mm long, ovate, acuminate, 3-nerved, nerves green, caducous; "petals" (sepals) 5, about twice the length of sepals. Capsule globose, ca. 5 mm diam., at dehiscence with the valves abscising, leaving the receptacle naked with only the free central placenta and possibly a few seeds remaining. Seeds less than 1 mm diam., the testa with radiate striations.

Specimens examined. NIGERIA. KWARA: Kabba, *J. Olorunfemi* (FHI 88405). OYO: Ibadan Univ., *D. P. M. Guile 138* (IFE); Ife Univ. campus, *A. A. Sijuade 197* (IFE); Adanre, on hill, *S. A. Ghazanfar s.n.* (BUK).

A common weed often found growing in shady locations. Common in southern Nigeria. Distinguished by its three-angled stems and swollen roots. The leaves are used as spinach. Flowering March–May. Yoruba: *Gbure, gure.* English name: waterleaf.

2. **Talinum portulacifolium** (Forsskal) Asch. ex Schweinf., Bull. Herb. Boiss. 4, App. 2: 172. 1896. *Orygra portulacifolia* Forsskal, Fl. Aegypt-Arab. cxiv. 1775. TYPE: Arabia: Yemen, *Forsskal 342* (holotype, C not seen).

Talinum cuneifolium Willd. in L., Sp. Pl., 4th edition, 2: 864. 1800.
[*Portulaca cuneifolia* Vahl., Symb. Bot. 1: 33. 1790, nom. illegit.]

Tall, woody herb, up to 70 cm tall. Taproot swollen. Branches few, glabrous. Leaves alternate, somewhat fleshy, 30–80 × 12–27 mm, obovate to oblanceolate, apex rounded, mucronate, base tapering into a short petiole. Flowering shoot usually without leaves. Inflorescence an elongated raceme, usually unbranched, up to 30 cm long. Bracts 1–4 mm long, lanceolate. "Sepals" (bracteoles) 4–6 mm long, apiculate, caducous; "petals" (sepals) pink or pinkish purple; stamens many; ovary ovoid; stigmas 3, spreading. Capsule ca. 6 mm diam., globose. Seed ca. 1 mm diam., subreniform, black, glossy, the testa with radiate striations.

Specimens examined. NIGERIA. ONDO: Ekiti, *M. G. Latilo & Fagbemi* (FHI 66300). OYO: Univ. of Ibadan, *J. Lowe 1179* (IFE); Ife Botanical Garden, not common, *J. B. Faremi 2* (IFE); Ibadan, Forest Rest House, *M. G. Latilo* (FHI 57093).

Not as common as *Talinum triangulare*. Found in shady and moist locations in southern Nigeria.

Distinguished from the last species by its habit and pink flowers in elongated racemes. The leaves eaten as greens. Flowering March–May.

BASELLACEAE

A small family with four genera and about 20 species, distributed chiefly in South America. Represented in Nigeria by one genus.

1. BASELLA L.

A small tropical genus with five species, of which one is endemic in eastern Africa, and three endemic in Madagascar. One species is pantropical. Represented in Nigeria by a single species.

Basella alba L., Sp. Pl. 272. 1753. TYPE: *Basella flore albo, foliis & caulibus viridibus* in Thran, Hort. Carolsruh. 10, n. 100. 1747. Figure 2E1–E3.

Basella rubra L., Sp. Pl. 272. 1753. TYPE: drawing of fruiting plant in Herb. Hermann 5, t. 207 (lectotype, BM not seen).

Perennial herb. Stems slender, twining, glabrous. Leaves simple, alternate, somewhat fleshy, up to 10 × 7 cm, ovate to broadly ovate, entire, apex acute to acuminate, base widely cordate; petiole up to 4 cm long. Flowers in axillary spikes. Peduncles long or short, slender. Bracts ovate, somewhat membranous. Flowers bisexual, white; "sepals" (bracteoles) 2, ca. 5 mm long, lobes rounded above, adnate to the base of the petal-like true sepals below; "petals" (sepals) 5, white, con-

nate below, 5-lobed above, persistent in fruit; stamens 5, adnate to the petal-like sepals below; style deeply 3-lobed, lobes flattened. Utricle ca. 5 mm diam., broadly ovoid, turning black when ripe, enclosed by the persistent fleshy perianth. Seed globose.

Specimens examined. NIGERIA. ONDO: Akure, in secondary forest, *J. Olorunfemi & S. T. Oguntayo* (FHI 86696). OYO: Gambari, *J. Lowe 1800* (IFE); Ife Univ. near main gate, *I. B. Faremi 910* (IFE); Ibadan, Sabo, *J. Olorunfemi* (FHI 43706).

Native of tropical and subtropical Africa, introduced and widely cultivated in Asia, West Indies, and South America. Cultivated in southern Nigeria for its edible leaves, which are cooked as spinach. Flowering October–November.

MOLLUGINACEAE

A family of about 13 genera and ca. 100 species, found mainly in the tropical and subtropical regions, especially in Africa. Represented in Nigeria by two genera and four species.

KEY TO THE GENERA OF MOLLUGINACEAE IN NIGERIA

1a. Flowers in axillary clusters; staminodes present; capsule dehiscence loculicidal; seeds strophiolate; leaves opposite ..... 1. *Glinus*
1b. Flowers in terminal, racemose, or cymose inflorescences; staminodes absent; capsule dehiscence by 3–5 valves; seeds estrophiolate; leaves alternate, pseudoverticillate or basal ..... 2. *Mollugo*

1. GLINUS L.

A genus of 12 species distributed in tropical and subtropical regions. A few species occur in warm temperate areas. Represented in Nigeria by two species.

KEY TO THE SPECIES OF *GLINUS* IN NIGERIA

1a. Pubescence stellate; flowers subsessile, in congested axillary cymules ..... 1. *G. lotoides*
1b. Pubescence not stellate; flowers with pedicels 10–13 mm long, in axillary, umbellate cymes ..... 2. *G. oppositifolius*

1. **Glinus lotoides** L., Sp. Pl. 463. 1753. TYPE: Sicily: *Linnaeus 631/1* (holotype, LINN not seen). Figure 3D1–D3.

Glinus dictaminoides Burm. f., Fl. Ind. 113. 1768. TYPE: India (holotype, G not seen).
Mollugo glinus A. Rich., Tent. Fl. Abyss. 1: 48. 1847. TYPE: Ethiopia: R. Takazze, *Quartin-Dillon & Schimper s.n.* (holotype, P not seen).

Annual herb, woody at the base. Stems up to 50 cm long, pubescent, branches diffuse. Leaves opposite, 15–20 × 9–10 mm, obovate, apex rounded, base tapering into the petiole; petiole 4–6 mm long, densely stellate-pubescent. Flowers in congested, axillary cymes. Pedicels 1–2 mm long, pubescent. Flowers bisexual; sepals 5, stellate-pubescent, 6–7 mm long, lanceolate, apex acute to mucronate, with a broad membranous margin; petals absent; stamens many, the filaments membranous, flattened, expanding at the base. Capsule ovoid, included in the calyx, dehiscing by 5 valves. Seeds 0.5 mm long, dark brown, subreniform, tuberculate, strophiolate.

Specimens examined. NIGERIA. ANAMBRA: Enugu, Abakaliki rd., *Latilo & Oguntayo* (FHI 67620). BORNO: Gasaka River, *Z. O. Gbile & B. O. Daramola* (FHI 61930). GONGOLA: Jimeta (Yola), *F. N. Hepper* (FHI 50071). KADUNA: Zaria, *J. A. D. Jackson* (FHI 58616); Zaria, near Jama village, *A. O. Ohaeri 975* (ABU). KWARA: Ilorin, Borgu Game Reserve, *I. B. Faremi* (FHI 1244, IFE). NIGER: Minna, Kafin Karo, Jibidiga Forest Reserve, *Eimunjeze, Adebusuyi & Macauley* (FHI 66496). SOKOTO: Sokoto, near Bin Yauri, rare, *J. B. Hall 2588* (FHI, IFE).

Occurs in moist shady locations. Found more or less throughout Africa as a weed of cultivated fields. Flowering March–June.

2. **Glinus oppositifolius** (L.) A. DC., Bull. Herb. Boiss., ser. 2, 1: 559. 1901. *Mollugo oppositifolia* L., Sp. Pl. 89. 1763. TYPE: Sri Lanka (Ceylon): *Hermann s.n.* (holotype, BM not seen). Figure 3C1–C3.

Mollugo spergula L., Syst. Nat. 10th edition. 88. 1759. TYPE: India (lectotype, LINN not seen).

Annual herb. Stems branching diffusely, erect to ascending, glabrous. Leaves opposite, 15–30 × 6–8 mm, oblanceolate to obovate, apex rounded to mucronate, base tapering into a short petiole; leaf margin obscurely toothed near the apex. Flowers in axillary, umbellate cymes. Pedicel 10–13 mm long, filiform. Flowers greenish or pinkish; sepals 5, 4–5 mm long, narrowly lanceolate, margin membranous, glabrous; staminodes 0–4, bifid; petals absent; stamens 4–10. Capsule 4–4.5 mm long, ovoid, included in the calyx. Seed ca. 0.5 mm long, dark brown, subreniform, beaked, surfaces tuberculate, strophiolate.

Specimens examined. NIGERIA. ANAMBRA: Udi, Idoro River, on the Enugu–Abakaliki rd., flowers white, *C. F. A. Onochie* (FHI 35831). IMO: Umuahia forest, *Ariwaodo et al.* (FHI 99552). LAGOS: Lagos, Ikorodu, Mijidun mangrove, *Magbagbeola et al.* (FHI 94878). OYO: Ife Univ.

dam site, close to water, in moist secondary forest, *I. B. Faremi s.n.* (IFE); Ibadan, Igbajo–Agbojuomis compound, flowers white, *M. G. Latilo* (FHI 58419, IFE). PLATEAU: Keffi, stream near Keffi Water Works, *P. Wit & B. O. Daramola* (FHI 78403).

Pantropical. Found in moist shady habitats near streams and at the edges of lakes and rivers throughout Nigeria. Flowering March–May.

Glinus lotoides and *Glinus oppositifolia* hybridize freely in nature, and the hybrids are interfertile with each of the parents. Hybridization and introgression therefore result in plants with a wide range of variable characters.

2. MOLLUGO L.

A genus of 20 tropical and subtropical species. Seven species occur in Africa and Madagascar. Represented in Nigeria by two species.

KEY TO THE SPECIES OF *MOLLUGO* IN NIGERIA

1a. All leaves radical; stems with small membranous bracts ..... 1. *M. nudicaulis*
1b. Leaves radical and cauline, linear ..... 2. *M. cerviana*

1. **Mollugo nudicaulis** Lam., Encyl. 4: 234. 1797. TYPE: Mauritius: *Commerson* (holotype, P? not seen).

Annual herb, glabrous. Stems erect, 15–20 cm tall. Cauline leaves absent. Basal leaves 40–50 × 10–12 mm, oblanceolate to spathulate, apex obtuse, base tapering into the petiole. Flowers in lax cymes. Pedicel 10–13 mm long, filiform. Bracts inconspicuous, ca. 2 mm long, membranous. Flowers bisexual, small; sepals 5, 2–3 mm long, glabrous, with a narrow membranous margin; petals absent; stamens 3–5. Capsule globose, included in the sepals, dehiscing by 3 valves. Seed ca. 0.5 mm diam., compressed, granulate.

Specimens examined. NIGERIA. CONGOLA: Yola, 5 mi. from Yurde on Yola–Bauchi rd., *S. O. Magiji* (FHI 17985); Gasaka, *T. K. Odewo* (FHI 18022). IMO: Umuahia, Ibeku, in farm, *A. O. Ohaeri 1972* (ABU). KWARA: Ilorin, Shagunu Research Station, *O. Olorode 230* (IFE); Lokoja, *B. O. Daramula & Osanyinlusi* (FHI 90187). ONDO: Owo, Iyere–Ogur rd., in savanna, *J. Olorunfemi & S. T. Oguntayo* (FHI 86605). OYO: Ibadan, *M. G. Latilo* (FHI 58431). SOKOTO: Sokoto, *M. G. Latilo* (FHI 62606).

Widespread in tropical Africa and Asia. A plant distinct in its slender stems and basal rossette of leaves. Found in shady or open places, on roadsides, and in cultivated places. Flowering April, August.

2. **Mollugo cerviana** (L.) Seringe in DC., Prodr. 1: 392. 1824. *Pharnaceum cerviana* L., Sp. Pl. 272. 1753. TYPE: Rostov, on Don, U.S.S.R., *Gerber s.n.* (lectotype, LINN not seen). Figure 3A1–A3.

Delicate annual herb. Stems erect 6–8(–15) cm long, glaucous; branches rigid, many arising from the base, spreading; lower parts of the stems usually leafless, straw-colored; basal and lower stem leaves usually withering away. Leaves in whorls, 5–15 × 0.5–7.5 mm, linear, 1-veined. Inflorescences axillary or terminal cymes. Pedicel filiform, 2.5–3 mm long, glabrous. Sepals 5, 2.5–3 mm long, broadly lanceolate, subacute, with broad hyaline margins, green-veined; stamens (3–)5, smaller than the sepals; petals absent. Capsule globose, slightly exceeding the sepals, dehiscing by 3 valves, these retuse at the apex. Seeds ca. 0.5 mm long, subreniform to triangular, compressed, smooth, brown.

Specimens examined. NIGERIA. BORNO: Maiduguri, along Alo River, stems red, flowers light yellow, *B. O. Daramola* (FHI 63698). CONGOLA: Yola, border of Benue River, *P. Wit & B. O. Daramola* (FHI 80359). KWARA: Okura Lafia, house compound, *M. G. Latilo* (FHI 60559). OYO: Igbetti, waste places, *P. D. Stanfield* (FHI 59865).

Widespread in Europe, Asia, Australia, tropical Africa, and tropical South America. A delicate plant, often in moist locations and in shady, sandy places. Flowering April–May.

Mollugo verticillata L., a widespread annual weed, has been recorded from Bukina Fasso (Upper Volta), Ivory Coast, and Angola in West Africa according to Hutchinson & Dalziel (1954), but I have not seen any material of this species from Nigeria. It is perhaps overlooked.

CARYOPHYLLACEAE

A family of about 75 genera and 2,000 species widely distributed in the North Temperate regions, found abundantly in the Mediterranean area. Poorly represented in tropical Africa. Respresented in Nigeria by five genera and ten species.

KEY TO THE GENERA OF CARYOPHYLLACEAE IN NIGERIA

1a. Leaves alternate; petals absent; fruit indehiscent, enclosed in the persistent calyx ..... 5. *CORRIGIOLA*
1b. Leaves opposite or apparently whorled; petals present; fruit dehiscent, not enclosed by the persistent calyx.
2b. Sepals connate; leaves exstipulate ..... 4. *UEBELINIA*

2b. Sepals free, leaves stipulate.
3a. Petals deeply bilobed; leaves opposite, not apparently whorled; stipules herbaceous ..... 3. *DRYMARIA*
3b. Petals not bilobed; leaves opposite but seemingly whorled; stipules membranous or scarious.
4a. Sepals keeled ..... 1. *POLYCARPON*
4b. Sepals not keeled ..... 2. *POLYCARPAEA*

1. POLYCARPON L.

A tropical and subtropical genus. Represented in Nigeria by a single species.

Polycarpon prostratum (Forsskal) Aschers & Schweinf., Oesterr. Bot. Zeitschr. 39: 128. 1889. *Alsine prostrata* Forsskal, Fl. Aegypt.-Arab. 207. 1775. TYPE: Egypt: near Cairo, *Forsskal* (holotype, C not seen). Figure 7A1–A4.

Pharnaceum depressum L., Mant. 2: 562. 1771. TYPE: E. India (holotype, LINN). [*Polycarpon depressum* (L.) Rohrb. in Martius, Fl. Bras. 14(2): 257, t. 59. 1872, non Nutt. (1839), nom. illegit.]
[*Polycarpon loeflingii* (Wight & Arn.) Benth., Gen. Pl. 1: 153. 1862, nom. illegit.]

Annual herbs. Stems up to 15 cm tall, ascending, branches spreading, glabrous or pubescent, often densely pubescent in the lower internodes, the upper internodes with a line of hairs on one side. Leaves apparently whorled, 0.5–3 × 0.1–0.5 mm, linear-oblanceolate, apex acute, base cuneate, white-pubescent or glabrous. Stipules 1–2 mm long, lanceolate, membranous. Flowers in axillary or terminal, much-branched cymes. Bracts 1–2 mm long, lanceolate-ovate. Pedicel 0.5–6 mm long. Flowers small; sepals 5, 3–4 mm long, lanceolate, with a broad green dorsal keel and hyaline margins; petals 5, elliptic, membranous, smaller than the sepals; stamens as long as the petals and alternating with them; filaments flattened, broad at the base. Capsule ellipsoid, included in the sepals, dehiscing by 3 valves. Seed less than 1 mm diam., smooth.

Specimens examined. NIGERIA. KADUNA: Jamia village, near Zaria, flowers whitish, *A. O. Ohaeri s.n.* (ABU). KANO: ca. 60 km S of Kano, *S. A. Ghazanfar s.n.* (BUK).

A pantropical species, usually found in damp and shady, sandy areas. Flowering June–August.

2. POLYCARPAEA Lam.

A genus with 50 tropical and subtropical species. (A few species occur in the U.S.A.) Represented in Nigeria by four species.

KEY TO THE SPECIES OF *POLYCARPAEA* IN NIGERIA

1a. Flowers in lax or congested cymes, not forming rounded heads.
2a. Sepals glabrous 1. *P. eriantha* var. *eriantha*
2b. Sepals pubescent.
3a. Sepals 1.5–2.5 mm long; leaves setose ..... 1. *P eriantha* var. *effusa*
3b. Sepals 2.5–3 mm long; leaves glabrous ..... 2. *P. stellata*
1b. Flowers in compact rounded heads.
4a. Ovules usually 3; sepals 2–3 mm long ..... 3. *P. linearifolia*
4b. Ovules more than 3; sepals 3–4 mm long ..... 4. *P. corymbosa*

1. **Polycarpaea eriantha** A. Rich., Tent. Fl. Abyss. 1: 303. 1848. TYPE: Ethiopia: near Gapdia, *Schimper 823* (isotype, K).

Annual herb, profusely branching from the base. Stems up to 15 cm long, decumbent to ascending, with white woolly hairs. Leaves opposite or in whorls at the nodes, (5–)10–15 × 3–4 mm, linear, setose. Stipules ca. 1.5 mm long, lanceolate with long hairs on the margins, scarious. Flowers in lax or congested, terminal, bracteate cymes. Flowers bisexual; sepals 5, 1.5–2.5 mm long, lanceolate, acute, white-woolly or glabrous; petals 5, about half as long as the sepals, oblong, tinged pink; stamens 5, smaller than the petals. Capsule dehiscing by 3 valves.

Polycarpaea eriantha var. **eriantha**

Sepals pubescent.

Additional specimens examined. NIGERIA. BAUCHI: Alkalire, 37 mi. E of Bauchi, *Lely 650* (K); Yankari rd., weed in farmland, *Oche & Tuley 1689* (K); Bangwele near Kulfana, 3,200 ft., on coarse laterite, in shade, *V. S. Summerhayes 40* (K); Yankari Game Reserve, *Geerling* (FHI 38364). KADUNA: Kan Gimi, *J. Olorunfemi* (FHI 24351; K); back of Borgu Game Reserve Museum, *J. B. Faremi 1111* (IFE). KWARA: Babana, old farmland, *Eimunjeze & M. G. Latilo 65619* (K); Ilorin, Shagunu Research Station, *J. B. Hall 287* (IFE).

A common savanna weed, distinguished by its silvery pinkish flowers. Often found in cultivated ground, by roadsides, and in sandy habitats. Widespread in tropical Africa. Flowering September–November. Hausa: *Sureddu*.

Polycarpaea eriantha var. **effusa** (Oliv. emend. Pax.) Turrill, Kew Bull. 1954: 503. 1954. TYPE: Nigeria: Nupe, *Barter 808* (lectotype, K).

Sepals glabrous.

FIGURE 7. A. *Polycarpon prostratum.*—A1. Habit.—A2. Flower.—A3. Flower with front sepals removed.—A4. Seed. B. *Polycarpaea linearifolia.*—B1. Habit.—B2. Bract.—B3. Flower.—B4. Flower with front sepal removed.—B5. Seed. C. *P. corymbosa,* habit. D. *Drymaria cordata.*—D1. Habit.—D2. Sepal.—D3. Petal.—D4. Seed. E. *Uebelinia nigerica.*—E1. Habit.—E2. Flower.—E3. Flower with front sepals and petals removed. Scale bars B1, C, D1, E1 = 20 mm; A1 = 10 mm; A2–3, B2–4, D2–3, E2–3 = 2 mm; A4, B5, D4 = 0.5 mm.

Additional specimen examined. NIGERIA. KWARA: Lokoja, *Dalton s.n.* (K).

Not as common as var. *eriantha* but perhaps undercollected. Grows in sandy habitats, with the type variety. Flowering September–November.

2. **Polycarpaea stellata** (Willd.) DC., Prodr. 3: 374. 1828. *Achyranthes stellata* Willd., Sp. Pl. 1: 11. 1798. TYPE: Guinea, *Thonning 950* (holotype, K, Thonn. Herb., not seen).

Annual or perennial herb. Stems branched, ±

erect, up to 20 cm tall, woolly pubescent. Leaves opposite, glabrous, up to 20 mm long, linear, tapering to an apical point. Stipules lanceolate, with a long acuminate apex, scarious. Flowers in lax cymes. Sepals 5, 2.5–3 mm long, lanceolate, with a long acuminate apex, silvery woolly; petals 5.

Specimen examined. NIGERIA. BENUE: Idah, *T. Vogel s.n.* (K).

Not common in Nigeria, perhaps undercollected. The collection cited above is the only record of the species from Nigeria. No specimens present at FHI. Flowering September.

3. **Polycarpaea linearifolia** (DC.) DC., Prodr. 3: 374. 1828. *Illecebrum linearifolium* (DC.) Pers., Syn. 1: 261. 1805. *Paronychia linearifolia* DC. in Lam., Encycl. 5: 26. 1804. TYPE: Senegal (holotype, P not seen). Figure 7B1–B5.

Annual or perennial herbs. Stems up to 40 cm tall or more, branched, ascending to erect, often woody at the base, white woolly. Leaves apparently whorled, 7–22(–25) × 1–2(–3) mm, subulate to linear, apex prolonged into a bristle. Stipules ca. 3 mm long, lanceolate, long-acuminate, with ciliate margins. Inflorescence of compact, bracteate cymose heads, these rounded, 1–3 mm across, terminal. Bracts sometimes forked. Pedicel 3–4 mm long, white woolly. Flowers bisexual; silvery-white; sepals 5, 2–3 mm long, lanceolate, glabrous; petals ovate-oblong, smaller than the sepals; ovary with usually 3 ovules; style almost absent. Capsule dehiscing by 3 valves.

Specimens examined. NIGERIA. BAUCHI: Yankari Game Reserve, *C. Geetling 2291* (FHI 38232). GONGOLA: by riverbank, *B. O. Daramola & Okoro* (FHI 98994). KWARA: Oke-Opin, *M. O. Ajayi* (FHI 26999; K); Lokoja, *Parsons s.n.* (K); Kainji, *H. D. Onyeachurim* (FHI 58111); same locality, *Jones* (FHI 5863; K). OYO: Oluwatedo, ca. 12 mi. W of Oyo, open savanna, *R. W. J. Keay* (FHI 25634; K); Iwo reservoir, *J. Lowe 2131* (IFE, K).

A woody herb common throughout tropical Africa. Occurs in open and woodland savanna, among rocks, in crevices, and on laterite soils. Bears a superficial resemblance to members of Amaranthaceae.

A fair amount of variation is present in the size of the inflorescence and the length of sepals and leaves. The specimen collected from 40 mi. southeast of Gombe, Bauchi State, *J. Lowe 1412* (IFE), shows sparse pubescence on the sepals and very reduced leaves. Flowering October–December. Hausa: *Magudiya.*

4. **Polycarpaea corymbosa** (L.) Lamk., Ill. Gen. Encycl. 2: 129. 1797. *Achyranthes corymbosa* L., Sp. Pl. 205. 1753. TYPE: Sri Lanka (Ceylon): herb. *Hermann* (lectotype, BM not seen). Figure 7C.

Annual herb. Stems erect, up to 30 cm tall, branching from the base, reddish when young, white woolly at the base. Leaves opposite, appearing whorled, 10–20 × 1 mm, linear, glabrous, apex ending in a bristle, caducous. Flowers in compact, terminal heads. Flowers silvery to pinkish; sepals 5, tinged red, 3–4 mm long, lanceolate, with a long acute tip, often segmented at the apex, glabrous; petals 5, 1 mm long, emarginate at the apex; stamens 5; ovules 6–15; style very reduced. Capsule included in the sepals, dehiscing by 3 valves.

Specimens examined. BORNO: Maiduguri, *Noble A3* (K). KADUNA: Kan Gimi, E of forest rest house, in cracks, *R. W. J. Keay* (FHI 21676; K). SOKOTO: Sokoto, *J. M. Dalziel 439* (K); Lake Chad, *H. C. Chowdhuri s.n.* (ABU).

Widespread in tropical Africa. Occurs in dry sandy areas by roadsides in northern Nigeria. Not common. Flowering November–December. Hausa: *Magudiya.*

3. DRYMARIA Willd.

A genus with 44 species, distributed mainly in Mexico. Represented in Nigeria by two species.

KEY TO THE SPECIES OF *DRYMARIA* IN NIGERIA

1a. Leaves and stems glabrous ..... 1. *D. cordata*
1b. Leaves and stems villous ..... 2. *D. villosa*

1. **Drymaria cordata** (L.) Willd. ex Roem. & Schult., Syst. Veg. 5: 406. 1819. *Holosteum cordatum* L., Sp. Pl. 88. 1753. TYPE: Jamaica and Surinam (holotype, LINN not seen). Figure 7D1–D4.

Small herb with weak stems, 7–30(–60) cm tall. Stems prostrate, creeping or scrambling, often rooting at the nodes. Leaves opposite, petiolate, distantly placed on the stems, glabrous, 10–27 × 6–18 mm, broadly ovate, base subcordate or rounded, apex mucronulate, 3–5-nerved. Stipules interpetiolar, 2–4 mm long, divided into linear or subulate segments. Flowers in lax terminal cymes. Bracts small, glabrous. Pedicel slender, viscid. Flowers bisexual; sepals 5, 4–5 mm long, glabrous, oblong-lanceolate, 3-nerved, persistent and becoming scarious in fruit; petals 5, 3.5–4 mm long, white, smaller than the sepals, deeply bifid into oblong lobes; stamens 5, about as long as the sepals;

style 3-lobed. Seed 1–1.25 mm diam., spherical, flattened on the sides, with concentric rows of rounded tubercles.

Specimens examined. NIGERIA. ANAMBRA: Enugu, *Onyemazu* (FHI 94968). CROSS RIVER: Obudu Cattle Ranch, in open forest, *J. Medler 904* (IFE); Ogoja, *Savory & R. W. J. Keay* (FHI 25191); SE Calabar, *B. O. Daramola* (FHI 89923). GONGOLA: Mambilla Plateau, *Fagbemi* (FHI 89923). KADUNA: Kaduna, *J. Lowe 2799* (FHI, IFE, K); Zaria, *A. O. Ohaeri 1613* (ABU).

Widespread in the tropics and subtropics. Common in shady and damp locations by roadsides and in ditches throughout Nigeria. Flowering May–August.

2. **Drymaria villosa** Cham. & Schlecht., Linnaea 5: 232. 1830. TYPE: Mexico: Jalapam, *Schiede & Deppe 505* (holotype, B, probably destroyed; isotype, LE not seen).

Drymaria cordata var. *pilosa* Schlecht., Linnaea 26: 374. 1853 (no type indicated).

Small delicate herb, with slender, weak stems 5–15 cm long, villous, rooting at the nodes. Leaves opposite, petiolate, villous, 10–20 × 15–18 mm, reniform. Flowers in lax, terminal cymes. Pedicels very slender, glandular. Sepals 5, glabrous, 3.5–4 mm long, oblong-lanceolate, nerves obscure; petals 5, white green, smaller than the sepals, bifid, with a divergent linear cusp on one side near the junction of lobes. Seed up to 1 mm diam.

Specimens examined. NIGERIA. CROSS RIVER: Obudu Cattle Ranch, *J. Medler 782* (IFE). GONGOLA: Mambila Plateau, weed in moist soil, 1,620 m, *Hepper 1811* (K).

A smaller and more delicate species than *D. cordata*. *Drymaria villosa* is similar to *D. cordata* but differs by having slender stems and leaves, and by the nerves on the sepals being absent or obscure. *Drymaria villosa* is a tropical American species, introduced and naturalized in West Africa. Flowering September–April.

4. UEBELINIA Hochst.

A genus with 10 species distributed in tropical Africa. Represented in Nigeria by two species.

KEY TO THE SPECIES OF *UEBELINIA* IN NIGERIA

1a. Calyx 4–6 mm long; leaves 6–15 × 4–8 mm, elliptic to broadly ovate ——— 1. *U. hispida*
1b. Calyx 3.5–4 mm long; leaves 8–10 × 5–7 mm, broadly ovate to elliptic-ovate ——— 2. *U. nigerica*

1. **Uebelinia hispida** Pax in Engl., Bot. Jahrb. 17: 586. 1893. TYPE: Kamerun (Cameroon): Buea, 2,200–2,300 ft., Sept. 1891. *Preuss 971–24* (holotype, P not seen).

Prostrate herb. Stems straggling, up to 40 cm long, sometimes tinged red, pilose to hispid. Leaves opposite, 6–15 × 4–8 mm, elliptic to broadly ovate, apex rounded, margin setulose, midrib setose, prominent; petiole somewhat winged. Pedicel 1–3 mm long, elongating up to 12 mm in fruit. Flowers white, axillary; sepals 5, connate below, 4–6 mm long, lobes acute, setose, 10-nerved; petals 5, 2–4 mm long, smaller than the sepals; stamens usually 10; styles 5. Capsule ca. 4 mm long, ovoid, included in the calyx, dehiscing by 5 valves.

Specimens examined. NIGERIA. CROSS RIVER: Obudu Cattle Ranch, south en route to cataract, grassland, *J. Medler 981* (IFE). GONGOLA: Sardauna, Gembu, *B. O. Daramola* (FHI 62378); Mambilla Plateau, Maisamari–Nguroje rd., *Ekwuno* (FHI 77119).

The above collections are a new record.

Found at 300–1,700 m. Apparently undercollected. Flowering September–December.

2. **Uebelinia nigerica** Turrill, Kew Bull. 260. 1954. TYPE: Nigeria: Bamenda, Bambili Bafut, Ngemba, *Edwin Ujor s.n.* (FHI 29994) (holotype, K; isotype, FHI). Figure 7E1–E3.

Diffusely branched herb with procumbent to ascending stems, up to 40 cm long, hirsute. Leaves opposite, 8–10 × 5–7 mm, distantly placed on the lower part of the stem, broadly obovate to elliptic-obovate, apex rounded, mucronulate, base narrowing into a short petiole; surfaces glabrous, midrib setulose-hispid adaxially; leaf margin setulose-ciliate. Flowers solitary, axillary. Pedicel slender, 2.5–3 mm long, hirsute, elongating in fruit. Flowers white; calyx 3.5–4 mm long, 5-lobed; lobes lanceolate, acuminate, 1-nerved, sparsely setose on the nerves and margin; petals 5, white, ca. 1.5 mm long, oblanceolate, emarginate; stamens 10, filaments ca. 1 mm long; styles 5. (Capsule 4 mm diam., included in the persistent calyx, dehiscing by 5 reflexing valves, not seen.)

Additional specimen examined. NIGERIA. CROSS RIVER: Obudu Cattle Ranch, flowers white, *J. A. Emwiogbon & Osanyinlusi* (FHI 81153).

The collection from Obudu cited above is a new record. The type collection, reported by Turrill (Kew Bull. 1954: 260) is from Cameroon and not Nigeria.

Uebelinia nigerica is similar to *U. hispida* but can be distinguished by its broadly ovate to elliptic-obovate leaves and smaller flowers.

The species is found at high altitudes (+1,700

m). It is probably undercollected. Flowering October.

5. CORRIGIOLA L.

A small, cosmopolitan genus with 10 species. Represented in Nigeria by a single species.

1. **Corrigiola russelliana** A. Chev., Bull. Mus. Hist. Nat. D'Hist. Nat. Ser. 2, 4: 1008. 1932. TYPE: Soudan Français: Niala près Djenné, 30 June 1899, *Chevalier* no. *1131* (holotype, P? not seen). Figure 1E1–E3.

Annual or biennial herbs, often forming clumps. Stems 2–6 cm long, glabrous, weak, spreading. Leaves alternate, 3–7 × 1.5–2 mm, oblong, obtuse, base tapering into a short petiole. Stipules scarious, apex lacerated. Flowers in cymes, in the axils of the upper leaves. Pedicel ca. 0.5 mm long. Flowers bisexual; sepals 5, connate below, lobes 1.75–2 mm long, oblong, obtuse, with a hyaline margin; petals absent; stamens 5, the filaments connate below; style very short. Nutlet ovoid, ca. 1 mm diam. at the base, included in the persistent calyx, indehiscent. Seed solitary, ca. 1 mm diam., subglobose, dark brown.

Specimen examined. NIGERIA. SOKOTO: Funtua–Gusau rd., *S. O. Oyewole 1551* (ABU).

Not common but perhaps undercollected. Found in dry localities in northern Nigeria. Flowering December.

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